# RUBY-D715VG2AR

## Industrial Motherboard
## ATX Board

# User's Manual

Version 1.1

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# How to Use This Manual

The manual describes how to configure your RUBY-D715VG2AR system board to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Host Board.

**Chapter 1:** System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this series model of single host board.

**Chapter 2: Hardware Configuration.** Show the definitions and locations of Jumpers and Connectors that you can easily configure your system.

**Chapter 3: System Installation.** Describes how to properly mount the CPU, main memory and Compact Flash to get a safe installation and provides a programming guide of Watch Dog Timer function.

**Chapter 4: BIOS Setup Information.** Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

**Chapter 5: Troubleshooting.** Provide various of useful tips to quickly get RUBY-D716VG2AR running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. The vendor may make supplement or change in the products described in this document at any time

# Chapter 1
# System Overview

## 1.1 Introduction

Powell Inc., a world-leading innovator in the Industrial PC (IPC) market and a member of the Intel® Communications Alliance, has launched its new RUBY-D715VG2AR in response to market demand for a simplified embedded system board (ESB) that combines a smaller footprint, lower power consumption, robust computing power and with longevity support.

Against the pre-generation chipset RUBY-D715VG2AR based on C216 chipset, C216 offers Core i3/Xeon processors, VGA, DVI-D, Display port, USB 3.0 and SATA III support which USB 3.0 is first integrated.

RUBY-D715VG2AR based on the latest 3nd Gen Intel® Xeon Processor which offers 22nm Hi-K process technology with energy efficient architecture. RUBY-D715VG2AR adopts four channels DDR3 long DIMMs up to 32GB.

Desktop solution is still popular in the market of DVR and Factory Automation which can fulfill most of these applications; therefore, with high performance and high-end specifications, Q77 is our first generation Ivy bridge chip architecture on

## 1.2 Check List

The RUBY-D715VG2AR package should cover the following basic items

✓ One RUBY-D715VG2AR Industrial Mother board
✓ One SATA III Cable
✓ One I/O Shield bracket
✓ One Installation Resources CD-Title

If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

## 1.3 Product Specification

- **Main Processor**
  -Intel® Dual Core/Quad Core i3/Xeon LGA1155 processor
- **Chipset**
  - Intel® C216 Express chipset
- **System BIOS**
  - Phoenix UEFI BIOS

- **Main Memory**
  -Four 240-pin DDR3 DIMM (ECC/non-ECC) socket support up to 32GB dual channel 1600/1333MHz memory
  -RUBY-D715VG2AR supports Non-ECC memory
- **Expansion Interface**
  One PCIe x16 slot
  One PCIe x16 slot (setting jump to support two PCIe x8 from CPU)
  One PCIe x4 slot
  Four PCI slots
- **SATA Interface**
  Five SATA ports(Two SATA 6Gb/s, Three SATA 3Gb/s)
  One CFEX (SATA 3Gb/s interface)
- **Serial Port**
  Support four RS232 and two RS232/422/485
- **USB Interface**
  Support Ten USB ports, four on rear I/O and six on board header for internal devices
- **Audio Interface**
  Connector for Mic-In, Line-In and Line-Out
- **Real Time Clock/Calendar (RTC)**
  Support Y2K Real Time Clock/Calendar
- **Watch Dog Timer**
  Support WDT function through software programming for enable/disable and interval setting
  General system reset
- **On-board Ethernet LAN**
  Two Gigabit Ethernet (10/100/1000 Mbits/sec) LAN ports using Intel 82579LM & 82583V GbE Ethernet Controller
- **High Drive GPIO**
  One pin-header for 8 bit GPIO(4bit in & 4bit out)
- **System Monitoring Feature**
  Monitor system temperature and major power sources.
- **Outline Dimension (L x W)**
  304.8mm (12") X 243.8mm (9.6")

- **Power Requirements**

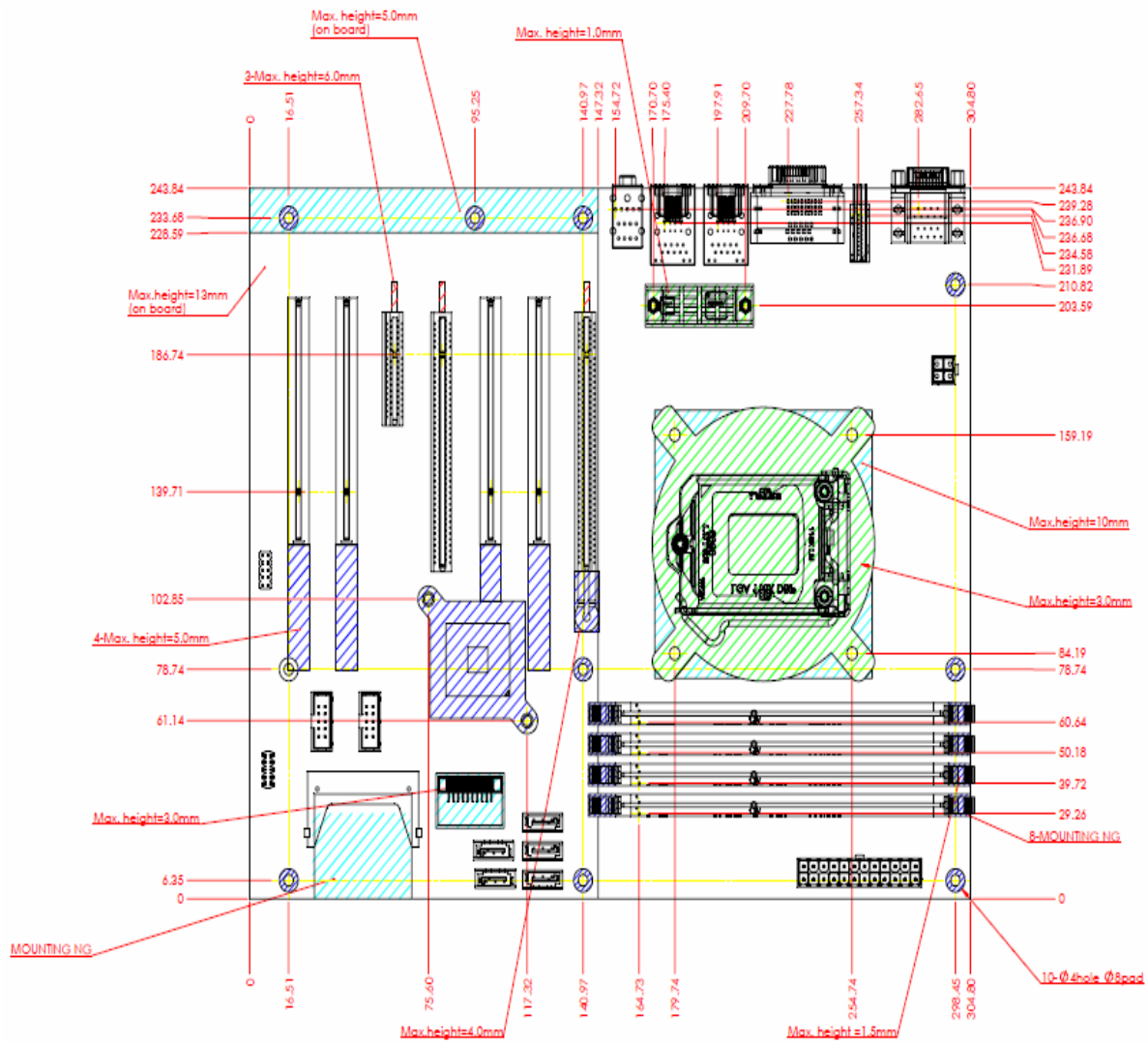
| Item | Power ON | Full Loading 10Min | Full Loading 30Min |
|---|---|---|---|
| **CPU +12V** | 1.90A | 3.15A | 3.32A |
| **System +12V** | 0.93A | 1.01A | 0.96A |
| **System +3.3V** | 0.63A | 0.97A | 0.90A |
| **System +5V** | 2.12A | 3.88A | 3.85A |
| **System+ Device +12V** | 3.75A | 4.77A | 4.47A |
| **System+ Device +5V** | 2.58A | 4.65A | 4.33A |
| **USB Loading Test** | 4.76~5.02V / 530mA | | |

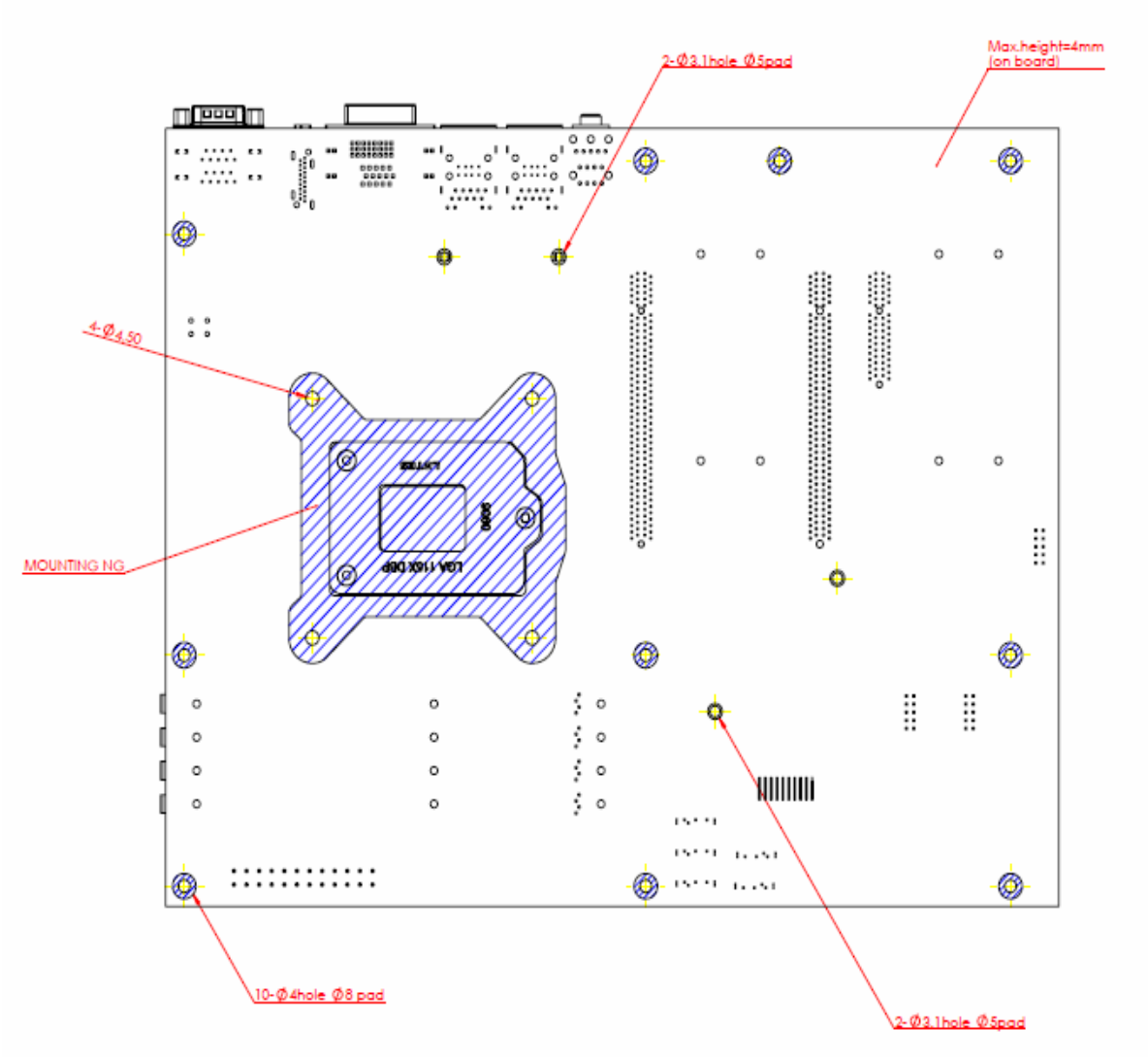
- **Configuration:**

| | |
|---|---|
| **CPU Type** | Intel(R) Xeon(R) CPU E3-1275 V2 @ 3.50GHz L3 8MBytes |
| **SBC BIOS** | Portwell, Inc. RUBY-D715VG2AR Rev.:R1.00.W1 (06102013) |
| **Memory** | WARIS DDR3 ECC-DIMM 1600/8GB (hynix H5TQ4G83MFR) x 4 |
| **VGA Card** | ONBOARD Intel(R) HD Graphics P4000 |
| **VGA Driver** | Intel(R) HD Graphics P4000 Version:9.17.10.2753 |
| **LAN Card** | ONBOARD Intel(R)82579LM Gigabit Network Connection |
| **LAN Driver** | Intel(R)82579LM Gigabit Network Connection Version:11.14.32.0 |
| **LAN Card** | ONBOARD Intel(R)82583V Gigabit Network Connection |
| **LAN Driver** | Intel(R)82583V Gigabit Network Connection Version:11.11.43.0 |
| **Audio Card** | ONBOARD Intel(R) Display Audio |
| **Audio Driver** | Intel(R) Display Audio Version:6.14.0.3090 |
| **Audio Card** | ONBOARD Realtek High Definition Audio |
| **Audio Driver** | Realtek High Definition Audio Version:6.0.1.6649 |
| **Chip Driver** | Intel(R) Chipset Device Software Version:9.3.0.1019 |
| **USB 3.0 Driver** | Intel(R) USB 3.0 eXtensible Host Controller Version:1.0.4.225 |
| **SCSI Card** | Adaptec SCSI Card 29160LP |
| **SCSI HDD** | SEAGATE ST39173W |
| **SATA HDD** | Seagate ST250DM000 250GB |
| **CDROM** | ASUS DRW-24D3ST DVD-ROM |
| **Power Supply** | Portwell ORION-D4601 |

- **Operating Temperature**
  0 °C ~ 60 °C
- **Storage temperature**
  -20 ~ 80 °C
- **Relative Humidity**
  0% ~ 90%, non-condensing

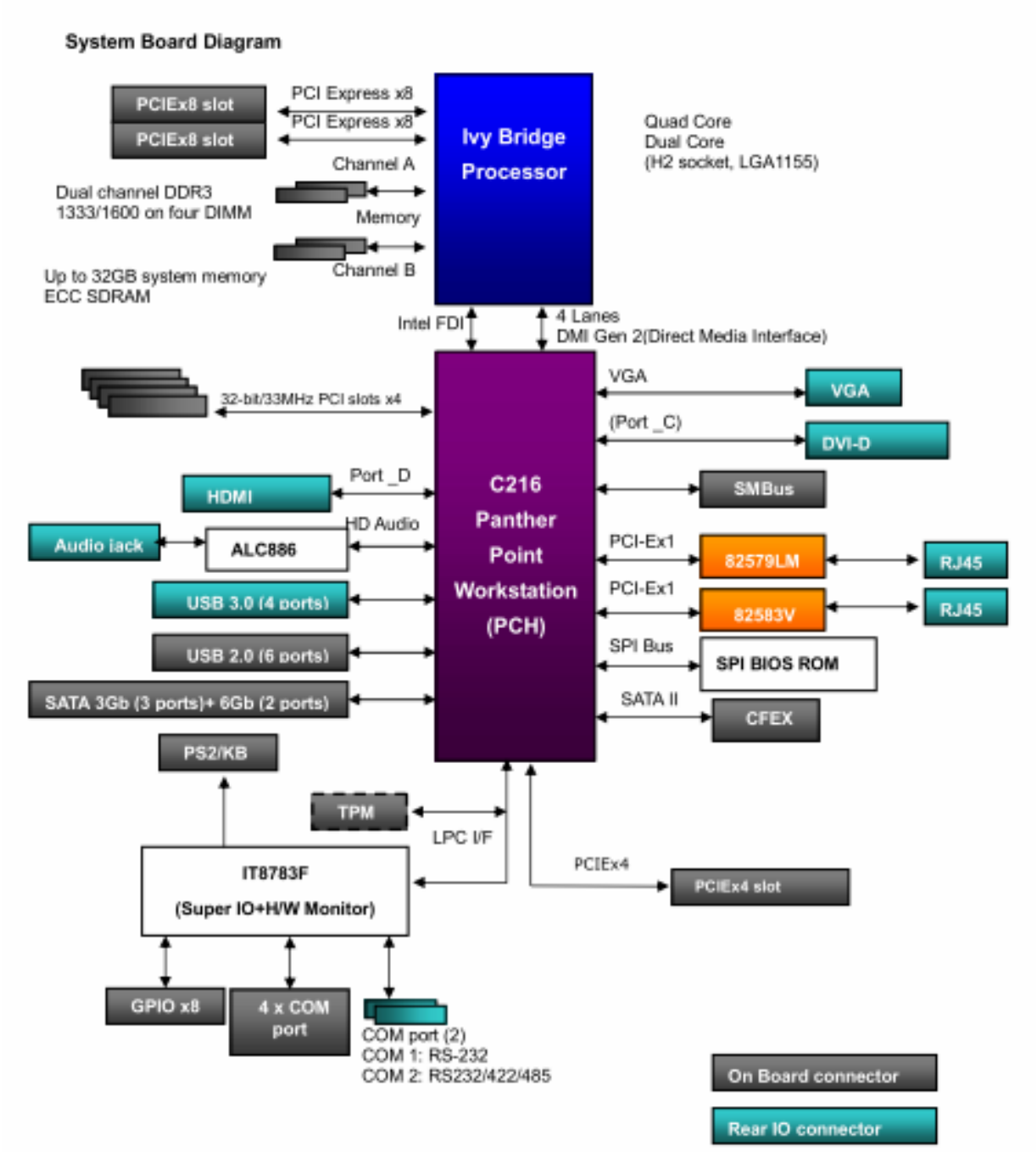
## 1.3.1 Mechanical Drawing




2-Ø3.1hole Ø5pad
Max.height=4mm
(on board)
4-Ø4.50
MOUNTING NG
10-Ø4hole Ø8 pad
2-Ø3.1hole Ø5pad

## 1.4 System Architecture

All of details operating relations are shown in RUBY-D715VG2AR System Block Diagram.




**RUBY-D715VG2AR System Block Diagram**

# Chapter 2
# Hardware Configuration

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on RUBY-D715VG2AR are in the proper position. The default settings shipped from factory are marked with an asterisk (★).

## 2.1 Jumper Setting

In general, jumpers on the single board computer are used to select options for certain features. Some of the jumpers are designed to be user-configurable, allowing for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (SHORT) or remove (NC) it from the jumper pins according to the following instructions. Here NC stands for "Not Connect".

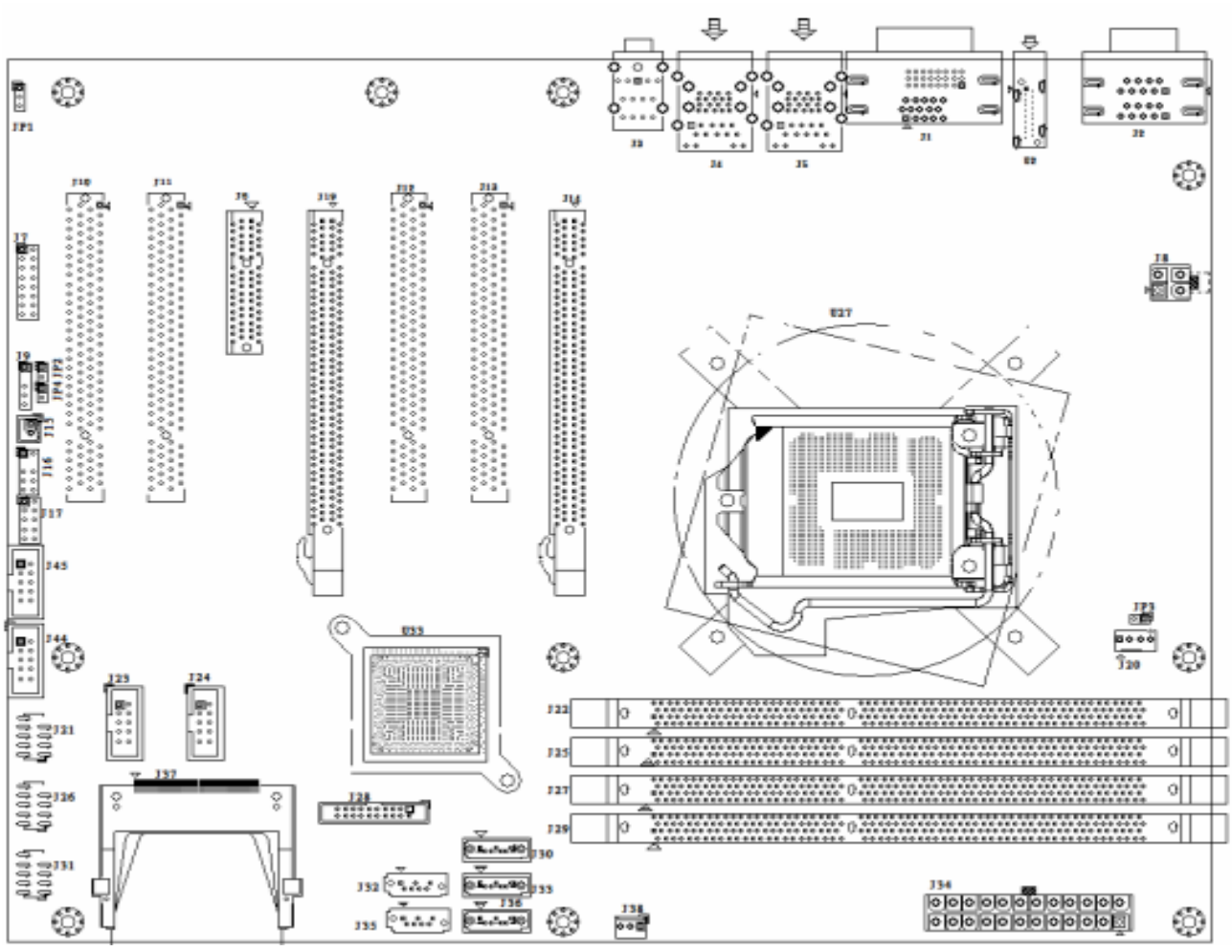


Figure 1-1 RUBY-D715VG2AR Top-side Jumper and Connector Locations

## Pin Assignments of Connectors

### JP1: Clear CMOS

| PIN No. | Signal Description |
|---|---|
| 1-2 | Normal |
| 2-3 | Clear CMOS |

### JP2: ATX / AT Mode Select

| PIN No. | Signal Description |
|---|---|
| 1-2 short | ATX emulation AT mode |
| 1-2 open | ATX mode ★ |

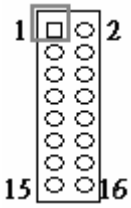
### JP3: Control CFG to Select PCIE x16 or x8

| PIN No. | Signal Description |
|---|---|
| 1-2 short | select x8 |
| 1-2 open | select x16 |

### JP4: Control Switch to Select PCIE x16 or x8

| PIN No. | Signal Description |
|---|---|
| 1-2 short | select x8 |
| 1-2 open | select x16 |

## J7: Front Panel System Connector

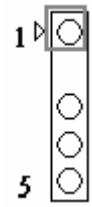



| PIN No. | Signal Description | PIN No. | Signal Description |
|---|---|---|---|
| 1 | PWR_LED(+) | 2 | Speaker(+) |
| 3 | PWR_LED(-) | 4 | N/C |
| 5 | J4 LAN1_ACT(+) | 6 | N/C |
| 7 | J4 LAN1_LINK(-) | 8 | Speaker(-) |
| 9 | J5 LAN2_LINK(-) | 10 | Power Button |
| 11 | J5 LAN2_ACT(+) | 12 | GND |
| 13 | HDD_LED(+) | 14 | GND |
| 15 | HDD_LED(-) | 16 | Rest |

## J8: ATX 4Pin 12V Power Connector

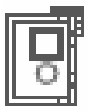
| PIN No. | Signal Description |
|---|---|
| 1 | Ground |
| 2 | Ground |
| 3 | +12V |
| 4 | +12V |

## J9: SMBus Connector



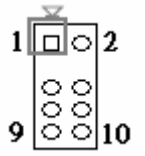

| PIN No. | Signal Description |
|---|---|
| 1 | SMBus_CLK |
| 2 | N/C |
| 3 | Ground |
| 4 | SMBus_DAT |
| 5 | +5V |

## J15: Case Open Connector



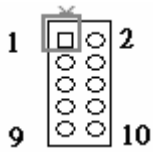
| PIN No. | Signal Description |
|---|---|
| 1 | GND |
| 2 | Case open |

## J16: External Keyboard/Mouse Connector



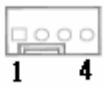

| PIN No. | Signal Description | PIN No. | Signal Description |
|---|---|---|---|
| 1 | Mouse Data | 2 | Keyboard Data |
| 3 | N/C | 4 | N/C |
| 5 | Ground | 6 | Ground |
| 7 | PS2 Power | 8 | PS2 Power |
| 9 | Mouse Clock | 10 | Keyboard Clock |

## J17: GPIO



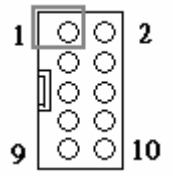

| PIN No. | Signal Description | PIN No. | Signal Description |
|---|---|---|---|
| 1 | LPC_GP60 | 2 | LPC_GP64 |
| 3 | LPC_GP61 | 4 | LPC_GP65 |
| 5 | LPC_GP62 | 6 | LPC_GP66 |
| 7 | LPC_GP63 | 8 | LPC_GP67 |
| 9 | GND | 10 | Vcc |

## J20: CPU FAN Power Connector



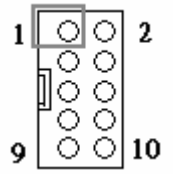

| PIN No. | Signal Description |
|---|---|
| 1 | Ground |
| 2 | +12V |
| 3 | Fan on/off output |
| 4 | Fan Speed control |

## J23/24: COM3/COM4 Serial Port Connector



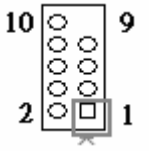

| PIN No. | Signal Description | PIN No. | Signal Description |
|---|---|---|---|
| 1 | DCD (Data Carrier Detect) | 2 | DSR (Data Set Ready) |
| 3 | RXD (Receive Data) | 4 | RTS (Request to Send) |
| 5 | TXD (Transmit Data) | 6 | CTS (Clear to Send) |
| 7 | DTR (Data Terminal Ready) | 8 | RI (Ring Indicator) |
| 9 | GND (Ground) | 10 | N/C |

## J44/45: COM5/COM6 Serial Port Connector




| PIN No. | Signal Description | PIN No. | Signal Description |
|---|---|---|---|
| 1 | DCD (Data Carrier Detect) | 2 | DSR (Data Set Ready) |
| 3 | RXD (Receive Data) | 4 | RTS (Request to Send) |
| 5 | TXD (Transmit Data) | 6 | CTS (Clear to Send) |
| 7 | DTR (Data Terminal Ready) | 8 | RI (Ring Indicator) |
| 9 | GND (Ground) | 10 | N/C |

## J21/J26/J31: External USB Connector




| PIN No. | Signal Description | PIN No. | Signal Description |
|---|---|---|---|
| 1 | 5V Dual | 2 | 5V Dual |
| 3 | USB- | 4 | USB- |
| 5 | USB+ | 6 | USB+ |
| 7 | Ground | 8 | Ground |
| 9 | 5V Dual | 10 | N/C |

**J38: SYSTEM FAN Power Connector**

| PIN No. | Signal Description |
|---|---|
| 1 | Ground |
| 2 | Fan speed control |
| 3 | Fan on/off output |

## 2.2 Connector Allocation

I/O peripheral devices are connected to the interface connectors.
Connector Function List

| Connector | Function | Remark |
|---|---|---|
| J1 | DVI & VGA Port | |
| J2 | COM PORT | COM2<br>Support 232/422/485 |
| J3 | Audio connector | |
| J4 | USB 0&1/100+Giga<br>Lan Connector (LAN1) 82579LM | |
| J5 | USB 2&3/100+Giga<br>Lan Connector (LAN2) 82583V | |
| J6 | PCI-E x4 Slot | Support x4 signal |
| J7 | Front Panel System Connector | |
| J8 | ATX 4Pin 12V Power Connector | |
| J9 | SMBUS HEADER | |
| J10、J11、J12、J13 | PCI Slot | |
| J14 | PCI-E x16 Slot | Support PCI-E Gen3 |
| J15 | Case Open Connector | |
| J16 | External Keyboard/<br>Mouse Connector | |
| J17 | 8Bit GPIO Connector | |
| J19 | PCI-E x16 Slot | Support SLI Function |
| J20 | CPU FAN Power Connector | |
| J21、J26、J31 | External USB Connector | |
| J22、J25、J27、J29 | DIMM | |
| J23、J24、J44、J45 | COM3/COM4/COM5/COM6<br>Serial Port Connector | |
| J28 | TPM(Trusted Platform<br>Module) Connector | |

| | | |
|---|---|---|
| J30、J33、J36 | SATA Connector(3Gb/s) | |
| J32、J35 | SATA Connector(6Gb/s) | |
| J34 | ATX Power | |
| J37 | CFEX Slot | |
| J38 | System FAN Power Connector | |
| U2 | HDMI Port | |
| JP1 | Clear CMOS | |
| JP2 | ATX / AT Mode Select | |
| JP3 | Control CFG to Select PCIE x16 or x8 | |
| JP4 | Control Switch to Select PCIE x16 or x8 | |

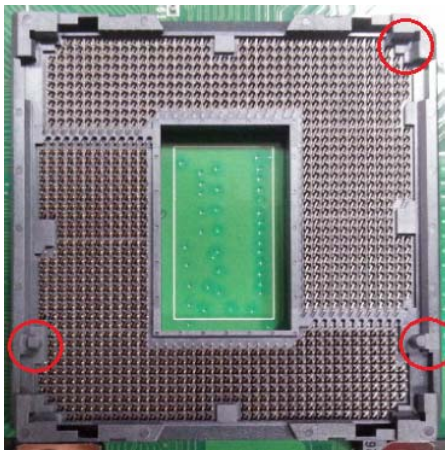
# Chapter 3
# System Installation

This chapter provides the instructions to set up the system. The additional information is enclosed to help you set up onboard devices

## 3.1 Intel® Dual Core/Quad Core processor

**LGA-1155 CPU Socket**

In the top, right corner of the CPU Socket is Pin1, and the red two circles are alignment key under the picture



Alignment key

**LGA-1155 CPU**

In the top, the Yellow Triangle of the CPU is Pin1.

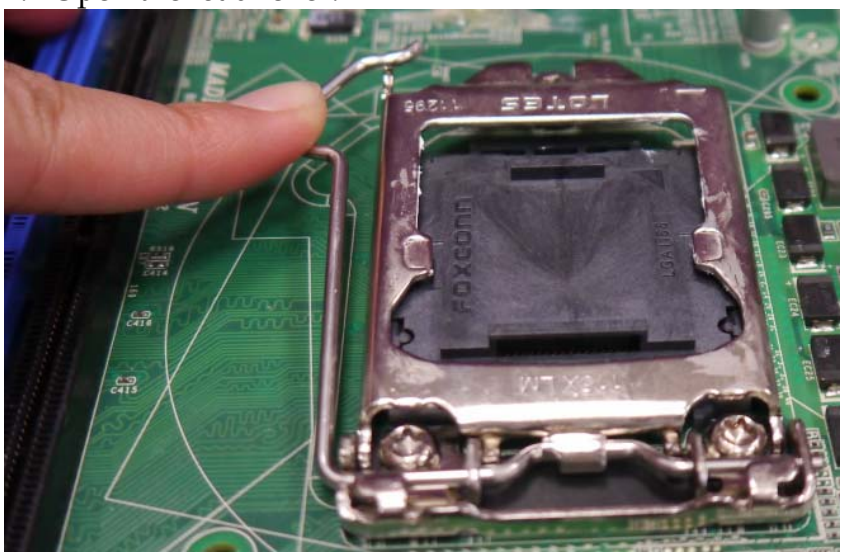
Notch

**Please remember to locate the alignment keys on the CPU socket of the motherboard and the notches on the CPU.**

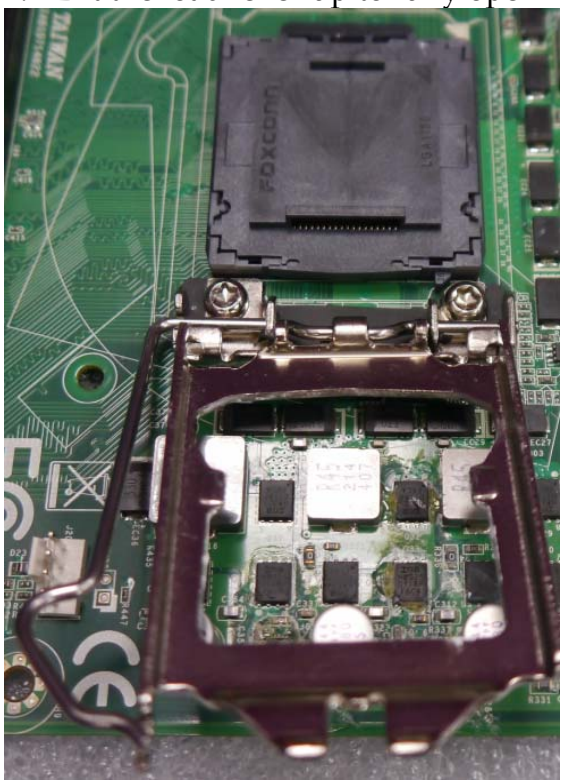
## LGA-1155 CPU Installation Steps

Before install the CPU, please make sure to turn off the power first!!

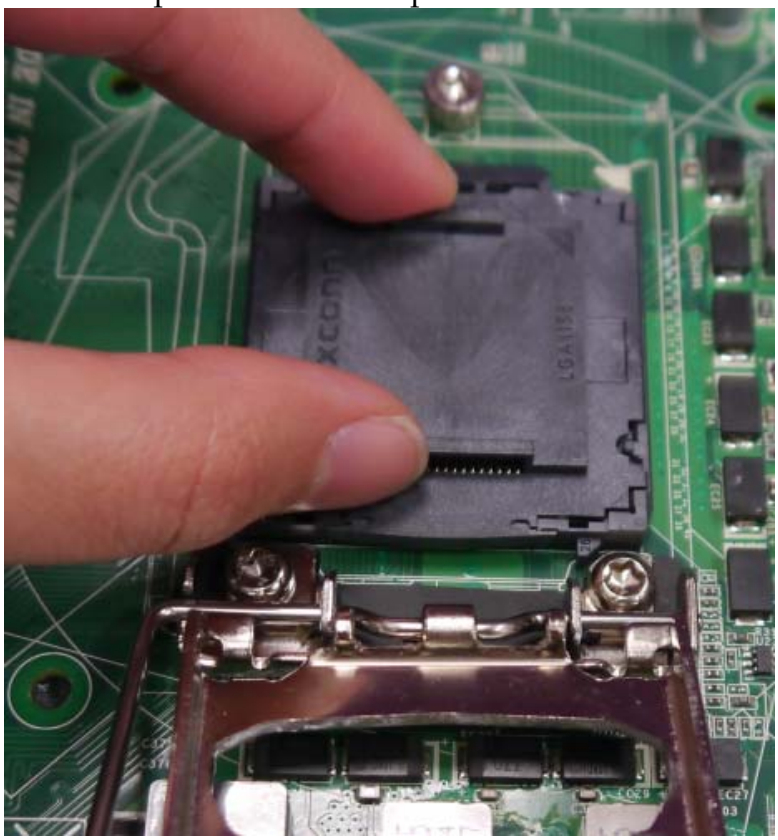
1. Open the load lever.



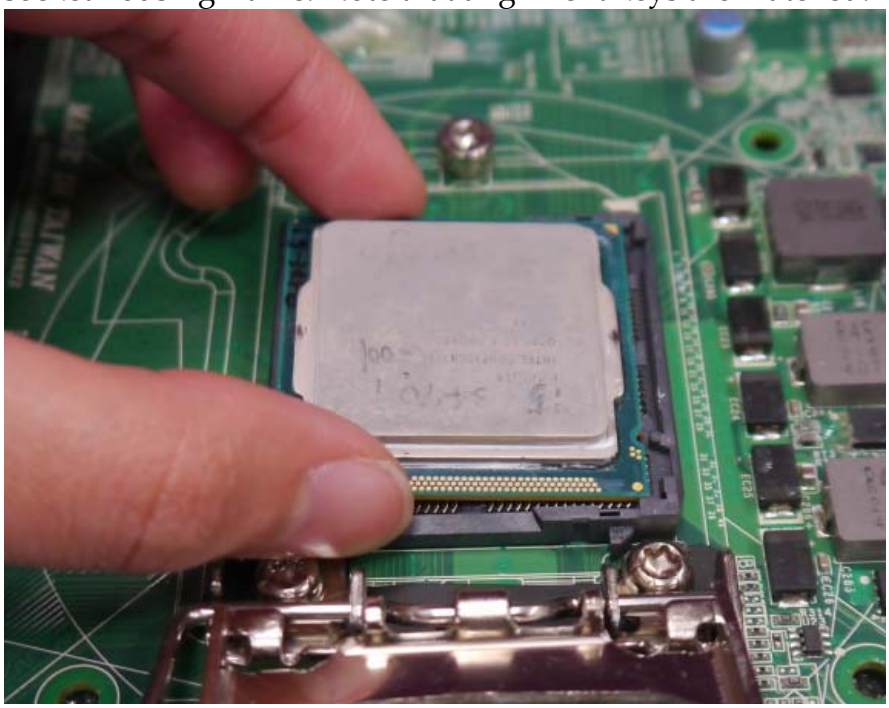

2. Lift the load lever up to fully open



3. Remove the plastic cap on the CPU socket. Before you install the CPU, always cover it to protect the socket pin.

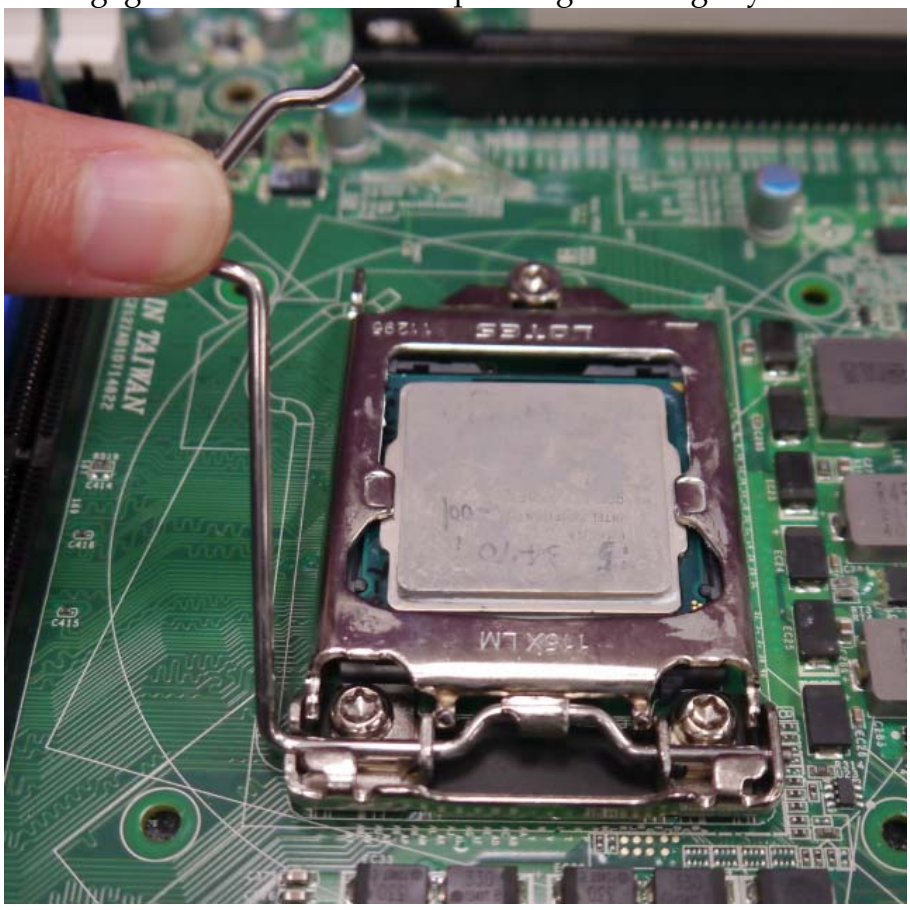


4. After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Note that alignment keys are matched.



5. Make sure the CPU has been seated well into the socket. If not, take out the CPU and reinstall.

6. Engage the load lever while pressing down lightly onto the load plate.



7. Push the CPU socket lever back into its locked position.

8. Please make sure four hooks are in proper position before you install the core.

## 3.2 Main Memory

RUBY-D715 provide 4x240 pin DIMM sockets (Dual Channel) which supports Dual channel non-ECC 1333/1600 DDR3-SDRAM and 32GB DDR3 ECC
memory, non-register function. The maximum memory can be up to 32GB.
Memory clock and related settings can be detected by BIOS via SPD interface.

For system compatibility and stability, do not use memory module without brand. Memory configuration can be set to either one double-sided DIMM in one DIMM socket or two single-sided DIMM in both sockets.

Beware of the connection and lock integrity from memory module to socket. Inserting improperly it will affect the system reliability.

Before locking, make sure that all modules have been fully inserted into the card slots

**Note:**
To insure the system stability, please do not change any of DRAM parameters in BIOS setup to modify system the performance without acquired technical information.

## 3.3 Installing the Single Board Computer

To install your RUBY-D715 into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position.
Step 2 : Install and configure CPU and memory module at right position.
Step 3 : Place RUBY-D715 into the dedicated position in the system.
Step 4 : Attach cables to existing peripheral devices and secure it.

**WARNING**
Please ensure that SBC is properly inserted and fixed by mechanism.

**Note**
Please refer to section 3.3.1 to 3.3.5 to install INF/VGA/LAN/Audio/AMT drivers.

### 3.3.1 Chipset Component Driver

RUBY-D715 uses state-of-art Intel® Panther Point chipset. It's a new chipset that some old operating systems might not be able to recognize. To overcome this compatibility issue, for previous Windows Operating Systems such as Windows XP, please install its INF before any of other Drivers are installed. You can find very easily this chipset component driver in RUBY-D715
CD-title.

Moreover, if using some old OS, the driver may not be supported anymore. We recommend changing the different OS to comply with this new chipset.

### 3.3.2 Intel® HD Graphics Family

With latest Intel® Quad Core and Dual core series structure (Ivy Bridge), RUBY-D715 Intel® HD Graphic 4000 is built in with CPU. Therefore 2nd Generation Core and 3nd

Generation Core CPUs provide HD integrated Graphic support sharing on board physical memories. RUBY-D715 has both internal VGA/DVI-D/HDMI interface. This combination makes RUBY-D715 an excellent piece of multimedia hardware. With no additional video adaptor, this onboard video will usually be the system display output. By adjusting the BIOS setting to disable on-board VGA, an add-on PCI-Express Graphic card can take over the system display. You can find very easily this graphic driver in RUBY-D715 CD-title.

※To use Intel® Integrated HD Graphic, it's required to choose the CPU which has Integrated Graphic built-in. Otherwise there will be no display whatsoever.

### 3.3.3 Intel® PROSet Gigabit Ethernet Controller

**Drivers Support**

Please find Intel® 82583V and 82579LM LAN driver form RUBY-D715 CD-title.

### 3.3.4 Audio Controller

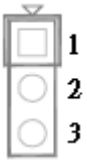
Please find Realtek ALC886-GR (Intel® High Definition Audio driver) form RUBY-D715 CD-title.

### 3.3.5 Intel® Active Management Technology (Intel® AMT)

Please find the latest Intel® AMT 8.0 driver from RUBY-D715 CD-title.

## 3.4 Clear CMOS Operation

**JP1: CLEAR CMOS**




| JP1 | Function |
|---|---|
| 1-2 Short | Normal Operation |
| 2-3 Short | Clear CMOS Contents |

## 3.5 WDT Function

The Watchdog Timer of motherboard consists of 8-bit programmable time-out counter and a control and status register.

**WDT Controller Register**
There are two PNP I/O port addresses that can be used to configure WDT.

2Eh: EFIR (Extended Function Index Register, for identifying CR index number)
2Fh: EFDR (Extended Function Data Register, for accessing desired CR)

**WDT Control Mode Register**
The working algorithm of the WDT function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from boards to boards.

RUBY-D715 allows users to control WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset or to non-maskable interrupt (NMI), when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action will restart the counting process. A well-written WDT program should keep the counting process running under normal condition. WDT should never generate a system reset or NMI signal unless the system runs into troubles.

The related Control Registers of WDT are all included in the following sample program that is written in C language. User can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or user can directly fill a zero value into Time-out Value Register to disable WDT immediately. To ensure a successful accessing to the content of desired Control Register, the sequence of following program codes should be step-by-step run again when each register is accessed.

Additionally, there are maximum 2 seconds of counting tolerance that should be considered into user' application program. For more information about WDT, please refer to ITE IT8783F data sheet.

There are two PNP I/O port addresses that can be used to configure WDT,
1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

**WDT Control Command Example**

```
#include <stdio.h>
#include <conio.h>
#include <dos.h>

#define SIO_Port 0x2E
#define SIO_Port2 0x4E
#define GPIO_LDN 0x07

void Enter_IT8783_SIO() {
outportb(SIO_Port, 0x87);
outportb(SIO_Port, 0x01);
outportb(SIO_Port, 0x55);
outportb(SIO_Port, 0x55);
}

void Set_LDN(unsigned char LDN) {
outportb(SIO_Port, 0x07);
outportb(SIO_Port+1, LDN);
printf("LDN=%x\n", LDN);
}
```

```
void Set_Register(unsigned char offset, unsigned char value) {
outportb(SIO_Port, offset);
outportb(SIO_Port+1, value);
printf("Write offset:%x = %x\n", offset, value);
}


int main(void) {
printf("test string\n");
Enter_IT8783_SIO();

Set_LDN(GPIO_LDN);

Set_Register(0x72, 0xC0);
Set_Register(0x73, 0x05);
printf("System will reset in 5 seconds\n");

return 0;
}
```

## 3.6 GPIO

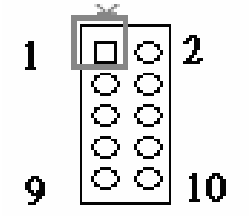
The motherboard provides 4 input/output ports that can be individually configured to perform a simple basic I/O function.

**GPIO Pin Assignment**

The RUBY-D715 provides 4 input/output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O Selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.

The GPIO port is located on J17 shown as follows. Please note: Do not short the Pin 9 and Pin 10 of the J17!

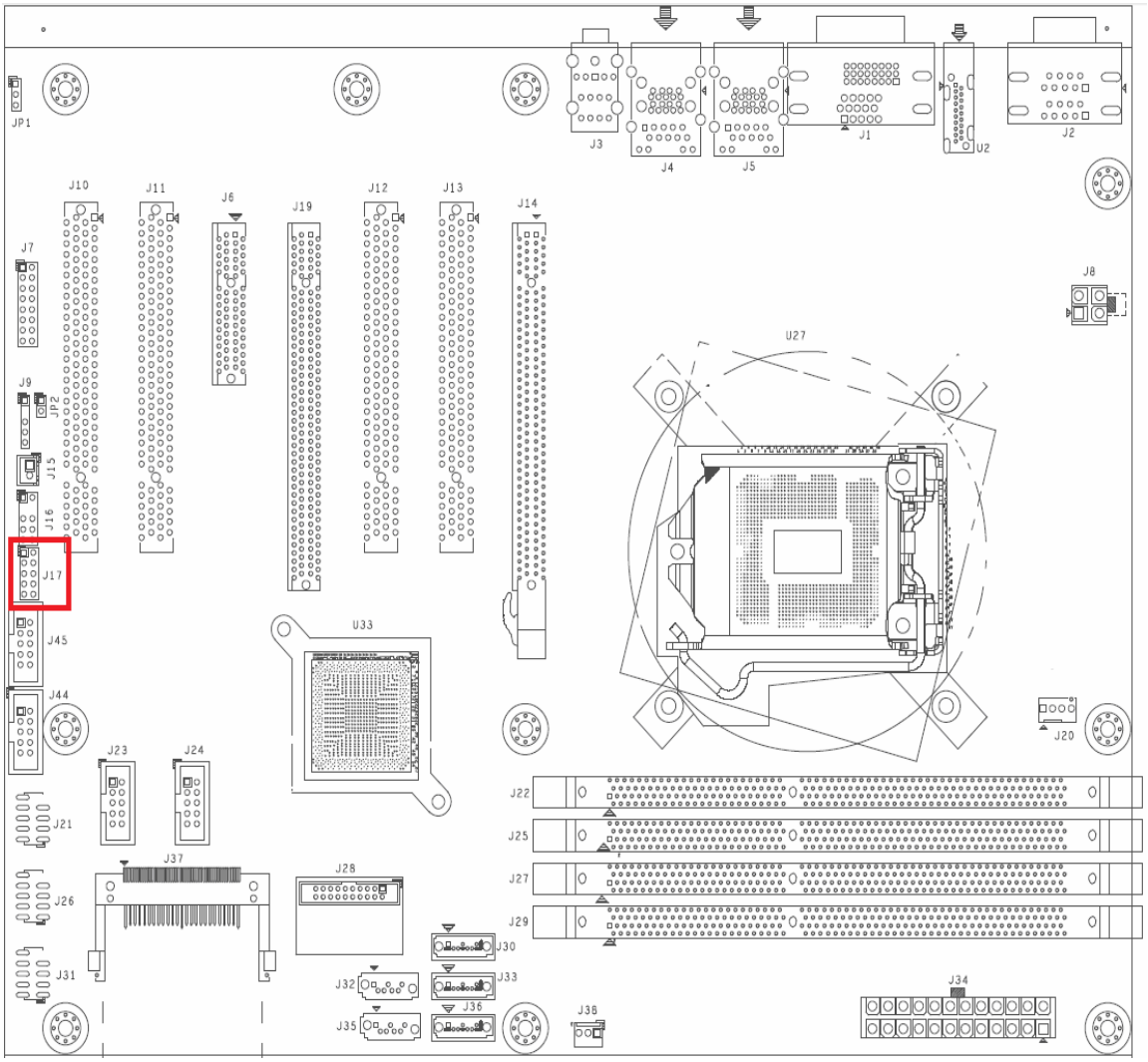
The control for the GPIO signals is handled through a separate 1-byte I/O space.



## J17: General Purpose I/O Connector

| PIN No. | Signal Description | PIN No. | Signal Description |
|---|---|---|---|
| 1 | LPC_GP60 | 2 | LPC_GP64 |
| 3 | LPC_GP61 | 4 | LPC_GP65 |
| 5 | LPC_GP62 | 6 | LPC_GP66 |
| 7 | LPC_GP63 | 8 | LPC_GP67 |
| 9 | GND | 10 | Vcc |

**Note:**
All General Purpose I/O ports can only apply to standard TTL±5% signal level (0V/5V), and each Fan.



**GPIO Control Command Example (C Language)**

```
/*****************************************************
 Sample Code for ITE series SIO GPIO Access
 SIO IO INDEX : 0x2E
 GPIO IO BASE : 0x0A00
 GPIO PIN Define:
 Pin 1 : GP60
 Pin 2 : GP61
 Pin 3 : GP62
 Pin 4 : GP63
 Pin 5 : GP64
 Pin 6 : GP65
 Pin 7 : GP66
 Pin 8 : GP67
*****************************************************/
#include <stdio.h>
#include <conio.h>
#include <string.h>
#include <dos.h>

//Common defines
#define HIGH 1
#define LOW    0
#define IN    1
#define OUT    0

//Prototype defines
Int Get_IT8783_GPIOBase(
   int IOINDEX
);

void Enter_IT8783_SIO(
 int IOINDEX
);

void Exit_IT8783_SIO(
 int IOINDEX
);

void Set_IT8783_LDN(
   int IOINDEX,
   int LDN
);
```

```
int Get_IT8783_Byte_Val(
   int IOINDEX,
   int offset
);

void Set_IT8783_Byte_Val(
  int IOINDEX,
   int offset,
   int Data
);

//MAIN Code Start
int main(){
return;
}

/**************************************************
Procedure Name: Get Super IO GPIO Base address
Check defines in config file name
input 1 : INT IOINDEX
return : GPIO BASE
**************************************************/
Int Get_IT8783_GPIOBase(int IOINDEX){
int IODATA = IOINDEX + 1;
int GPIOBASE;

//SIO Enter Key
Enter_IT8783_SIO(IOINDEX);
//Change LDN to 7 (GPIO)
Set_IT8783_LDN(IOINDEX,0x07);
//Get GPIO BASE
GPIOBASE = Get_IT8783_Byte_Val(IOINDEX,0x62) * 0x100;
GPIOBASE = GPIOBASE + Get_IT8783_Byte_Val(IOINDEX,0x63);
return GPIOBASE;
}

/**************************************************
Procedure Name : Enter IT8783 Super IO
Check defines in config file name
input 1 : INT IOINDEX
**************************************************/
void Enter_IT8783_SIO(int IOINDEX){
int IODATA = IOINDEX + 1;
outportb(IOINDEX,0x87);
outportb(IOINDEX,0x01);
outportb(IOINDEX,0x55);
```

```
outportb(IOINDEX,0x55);
return;
}

/*****************************************************
Procedure Name: Exit IT8783 Super IO
Check defines in config file name
input 1 : INT IOINDEX
*****************************************************/
void Exit_IT8783_SIO(int IOINDEX) {
    int IODATA = IOINDEX + 1;
    outportb(IOINDEX,0x02);
outportb(IODATA ,0x02);
return;
}

/*****************************************************
Procedure Name: Change IT8783 LDN
Description: Change Super IO Logical Device Number
Input 1: INT IOINDEX
Input 2: INT LDN(Logical Device Number)
*****************************************************/
void Set_IT8783_LDN(
  int IOINDEX,
  int LDN ){
   int IODATA = IOINDEX+1;
outportb(IOINDEX,0x07);
outportb(IODATA, LDN);
return;
}

/*****************************************************
Procedure Name: Get IT8783 offset data
Description       : Get IT8783 offset byte data
Input 1: INT IOINDEX
Input 2: INT offset
return: INT Data (Byte)
*****************************************************/
int Get_IT8783_Byte_Val(
  int IOINDEX,
  int offset    ){
int Data;
int IODATA = IOINDEX + 1;
outportb(IOINDEX,offset);          //set offset of data read
Data = inportb(IODATA);            //Get Data from offset
return Data;
```

```
}

/*****************************************************
Procedure Name: Set IT8783 offset data
Description: Set Byte data to IT8783 offset
input 1 : INT IOINDEX
input 2 : INT offset
input 3 : INT Data
*****************************************************/
void Set_IT8783_Byte_Val(
  int IOINDEX,
  int offset,
  int Data    ) {
int IODATA = IOINDEX + 1;
outportb(IOINDEX,offset);
outportb(IODATA, Data);
return;
}

/*****************************************************
Procedure Name: Set GPIO Pin 1 Mode & In/Out data
Description: Set GPIO Pin I/O Mode
                if GPIOMode is Input, input 2 data will
                don't care and this function will return
read value.
Pin 1: GP60
input 1 : INT GPIOMode
input 2 : INT Data
Out 1: INT Data
*****************************************************/
int SET_GPIO_PIN1(
int GPIOMode,
int Data ) {
            //GPIO Mode is Output
if(GPIOMode = 0){
            Set_IT8783_Byte_Val(0x2E,0xCD,Get_IT8783_Byte_Val(0x2E,0xCD) |
(1<<0));
            //if Data is HIGH
            if(Data==1){
            outportb(0x0A00 + 5, 1<<0);
            }
            //if Data is LOW
            if(Data==0){
            outportb(0x0A00 + 5, (inportb(0x0A00 + 5) & ~(1<<0) ) );
            }
            return NULL;
```

```
            }
            //GPIO Mode is Input
            else if(GPIOMode = 1){
            Set_IT8783_Byte_Val(0x2E,0xCD,Get_IT8783_Byte_Val(0x2E,0xCD)&
~(1<<0));
            Data = inportb(0x0A00 + 5) & (1<<0);
            return Data;
            }
return NULL;
}

/*****************************************************

Procedure Name: Set GPIO Pin 2 Mode & In/Out data
Description: Set GPIO Pin I/O Mode

                        if GPIOMode is Input , input 2 data will
                        don't care and this function will return

                        read value.
Pin 2: GP61
Input 1: INT GPIOMode
Input 2: INT Data
Out 1: INT Data
*****************************************************/
int SET_GPIO_PIN2(
int GPIOMode,
int Data ) {
            //GPIO Mode is Output
            if(GPIOMode = 0){
            Set_IT8783_Byte_Val(0x2E,0xCD,Get_IT8783_Byte_Val(0x2E,0xCD) |
(1<<1));
            //if Data is HIGH
            if(Data==1){
                        outportb(0x0A00 + 5, 1<<1 );
                        }
            //if Data is LOW
            if(Data==0){
                        outportb(0x0A00 + 5, (inportb(0x0A00 + 5) & ~(1<<1) ) );
                        }
                        return NULL;
            }
            //GPIO Mode is Input
            else if(GPIOMode = 1){
            Set_IT8783_Byte_Val(0x2E,0xCD,Get_IT8783_Byte_Val(0x2E,0xCD)       &
~(1<<1));
```

```
                    Data = inportb(0x0A00 + 5) & (1<<1);
                    return Data;
        }
        return NULL;
}

/*****************************************************

Procedure Name: Set GPIO Pin 3 Mode & In/Out data

Description: Set GPIO Pin I/O Mode

                    if GPIOMode is Input , input 2 data will

                    don't care and this function will return

                    read value.
Pin 3:GP62
Input 1: INT GPIOMode
Input 2: INT Data
Out 1: INT Data
*****************************************************/
int SET_GPIO_PIN3(
int GPIOMode,
int Data ){
        //GPIO Mode is Output
        if(GPIOMode = 0){
        Set_IT8783_Byte_Val(0x2E,0xCD,  Get_IT8783_Byte_Val(0x2E,0xCD)  |
(1<<2));
        //if Data is HIGH
        if(Data==1){
        outportb(0x0A00 + 5, 1<<2 );
        }
        //if Data is LOW
        if(Data==0){
        outportb(0x0A00 + 5, (inportb(0x0A00 + 5) & ~(1<<2) ) );
        }
        return NULL;
        }
        //GPIO Mode is Input
        else if(GPIOMode = 1){
        Set_IT8783_Byte_Val(0x2E,0xCD,  Get_IT8783_Byte_Val(0x2E,0xCD)  &
~(1<<2));
        Data = inportb(0x0A00 + 5) & (1<<2);
        return  Data;
        }
```

```
return NULL;
}

/*****************************************************

Procedure Name: Set GPIO Pin 4 Mode & In/Out data
Description: Set GPIO Pin I/O Mode

                if GPIOMode is Input , input 2 data will

                don't care and this function will return

                read value.

Pin 4: GP63
Input 1 : INT GPIOMode
Input 2: INT Data
Out 1: INT Data
*****************************************************/
int SET_GPIO_PIN4(
int GPIOMode,
int Data ) {
                //GPIO Mode is Output
                if(GPIOMode = 0){
                Set_IT8783_Byte_Val(0x2E,0xCD,    Get_IT8783_Byte_Val(0x2E,0xCD)    |
(1<<3));
                //if Data is HIGH
                if(Data==1){
                outportb(0x0A00 + 5, 1<<3 );
                }
                //if Data is LOW
                if(Data==0){
                outportb(0x0A00 + 5, (inportb(0x0A00 + 5) & ~(1<<3) ) );
                }
                return NULL;
                }
                //GPIO Mode is Input
                else if(GPIOMode = 1){
                Set_IT8783_Byte_Val(0x2E,0xCD,    Get_IT8783_Byte_Val(0x2E,0xCD)    &
~(1<<3));
                Data = inportb(0x0A00 + 5) & (1<<3);
                return      Data;
                }
return NULL;
}
```

```
/*****************************************************

Procedure Name: Set GPIO Pin 5 Mode & In/Out data
Description: Set GPIO Pin I/O Mode
             if GPIOMode is Input , input 2 data will

             don't care. and this function will return

             read value.

Pin 5: GP64
Input 1: INT GPIOMode
Input 2: INT Data
Out 1: INT Data
*****************************************************/
int SET_GPIO_PIN5(
int GPIOMode,
int Data    ){
            //GPIO Mode is Output
            if(GPIOMode = 0){
            Set_IT8783_Byte_Val(0x2E,0xCD,    Get_IT8783_Byte_Val(0x2E,0xCD)    |
(1<<4));
            //if Data is HIGH
            if(Data==1){
            outportb(0x0A00 + 5, 1<<4 );
            }
            //if Data is LOW
            if(Data==0){
            outportb(0x0A00 + 5, (inportb(0x0A00 + 5) & ~(1<<4) ) );
            }
            return NULL;
            }
            //GPIO Mode is Input
            else if(GPIOMode = 1){
            Set_IT8783_Byte_Val(0x2E,0xCD,    Get_IT8783_Byte_Val(0x2E,0xCD)    &
~(1<<4));
            Data = inportb(0x0A00 + 5) & (1<<4);
            return      Data;
            }
return NULL;
}

/*****************************************************

Procedure Name: Set GPIO Pin 6 Mode & In/Out data
Description: Set GPIO Pin I/O Mode
```

```
                if GPIOMode is Input , input 2 data will

                don't care and this function will return

                read value.

Pin 6: GP65
Input 1: INT GPIOMode
Input 2: INT Data
Out 1: INT Data
*****************************************************/
int SET_GPIO_PIN6(
int GPIOMode,
int Data ) {
                //GPIO Mode is Output
                if(GPIOMode = 0){
                Set_IT8783_Byte_Val(0x2E,0xCD,    Get_IT8783_Byte_Val(0x2E,0xCD)    |
(1<<5));
                //if Data is HIGH
                if(Data==1){
                outportb(0x0A00 + 5, 1<<5 );
                }
                //if Data is LOW
                if(Data==0){
                outportb(0x0A00 + 5, (inportb(0x0A00 + 5) & ~(1<<5) ) );
                }
                return NULL;
                }
                //GPIO Mode is Input
                else if(GPIOMode = 1){
                Set_IT8783_Byte_Val(0x2E,0xCD,    Get_IT8783_Byte_Val(0x2E,0xCD)    &
~(1<<5));
                Data = inportb(0x0A00 + 5) & (1<<5);
                return      Data;
                }
return NULL;
}

/*****************************************************

Procedure Name: Set GPIO Pin 7 Mode & In/Out data
Description: Set GPIO Pin I/O Mode
                if GPIOMode is Input , input 2 data will

                don't care and this function will return
```

read value.

Pin 7: GP66
Input 1: INT GPIOMode
Input 2: INT Data
Out 1: INT Data
**********/
int SET_GPIO_PIN7(
int GPIOMode,
int Data ) {
//GPIO Mode is Output
if(GPIOMode = 0){
Set_IT8783_Byte_Val(0x2E,0xCD, Get_IT8783_Byte_Val(0x2E,0xCD) |
(1<<6));
//if Data is HIGH
if(Data==1){
outportb(0x0A00 + 5, 1<<6 );
}
//if Data is LOW
if(Data==0){
outportb(0x0A00 + 5, (inportb(0x0A00 + 5) & ~(1<<6) ) );
}
return NULL;
}
//GPIO Mode is Input
else if(GPIOMode = 1){
Set_IT8783_Byte_Val(0x2E,0xCD, Get_IT8783_Byte_Val(0x2E,0xCD) &
~(1<<6));
Data = inportb(0x0A00 + 5) & (1<<6);
return Data;
}
return NULL;
}

/**********

Procedure Name: Set GPIO Pin 8 Mode & In/Out data
Description: Set GPIO Pin I/O Mode

if GPIOMode is Input , input 2 data will

don't care and this function will return

read value.

Pin 8: GP67

```
Input 1: INT GPIOMode
Input 2: INT Data
Out 1: INT Data
**************************************************/
int SET_GPIO_PIN8(
int GPIOMode,
int Data ) {
            //GPIO Mode is Output
            if(GPIOMode = 0){
            Set_IT8783_Byte_Val(0x2E,0xCD,    Get_IT8783_Byte_Val(0x2E,0xCD)    |
(1<<7));
            //if Data is HIGH
            if(Data==1){
            outportb(0x0A00 + 5, 1<<7 );
            }
            //if Data is LOW
            if(Data==0){
            outportb(0x0A00 + 5, (inportb(0x0A00 + 5) & ~(1<<7) ) );
            }
            return NULL;
            }
            //GPIO Mode is Input
            else if(GPIOMode = 1){
            Set_IT8783_Byte_Val(0x2E,0xCD,    Get_IT8783_Byte_Val(0x2E,0xCD)    &
~(1<<7));
            Data = inportb(0x0A00 + 5) & (1<<7);
            return Data;
            }
return NULL;
}
```

# Chapter 4
# BIOS Setup Information

RUBY-D715 is equipped with the Phoenix BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, RUBY-D715 communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start up.

## 4.1 Entering Setup -- Launch System Setup

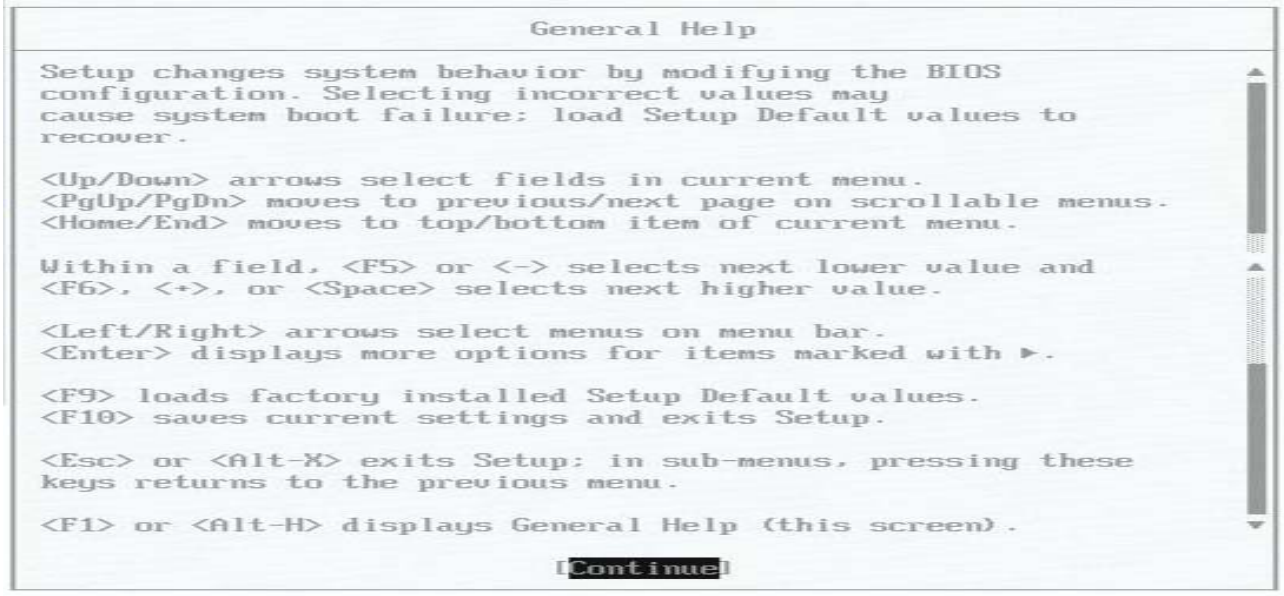
Power on the computer and the system will start POST (Power on Self Test) process. When the message below appears on the screen, press <F2> key will enter BIOS setup screen.

**Press <F2> to enter SETUP**

If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt> and <Delete> keys on keyboard simultaneously.

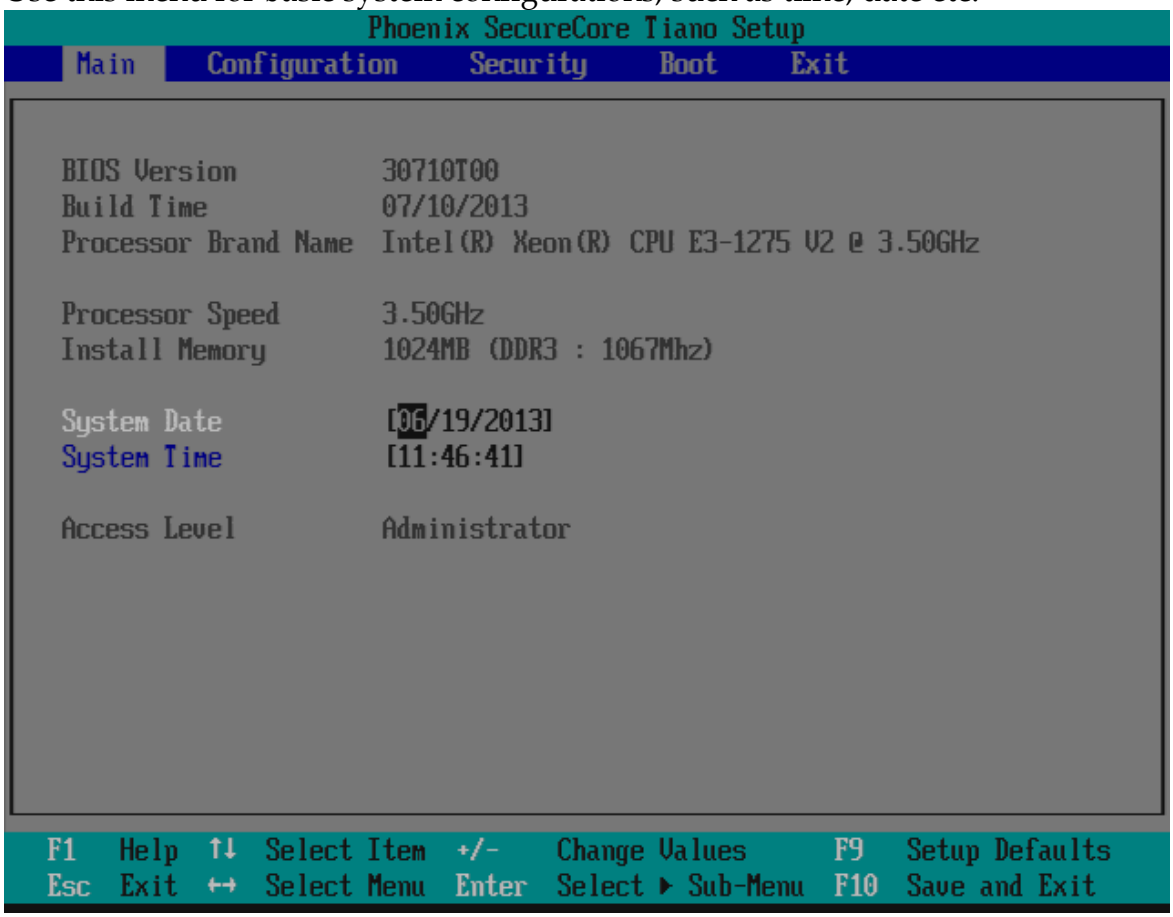
**Press <F1> to Run General Help or Resume**

The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help screen.



## 4.2 Main

Use this menu for basic system configurations, such as time, date etc.




**System Date**

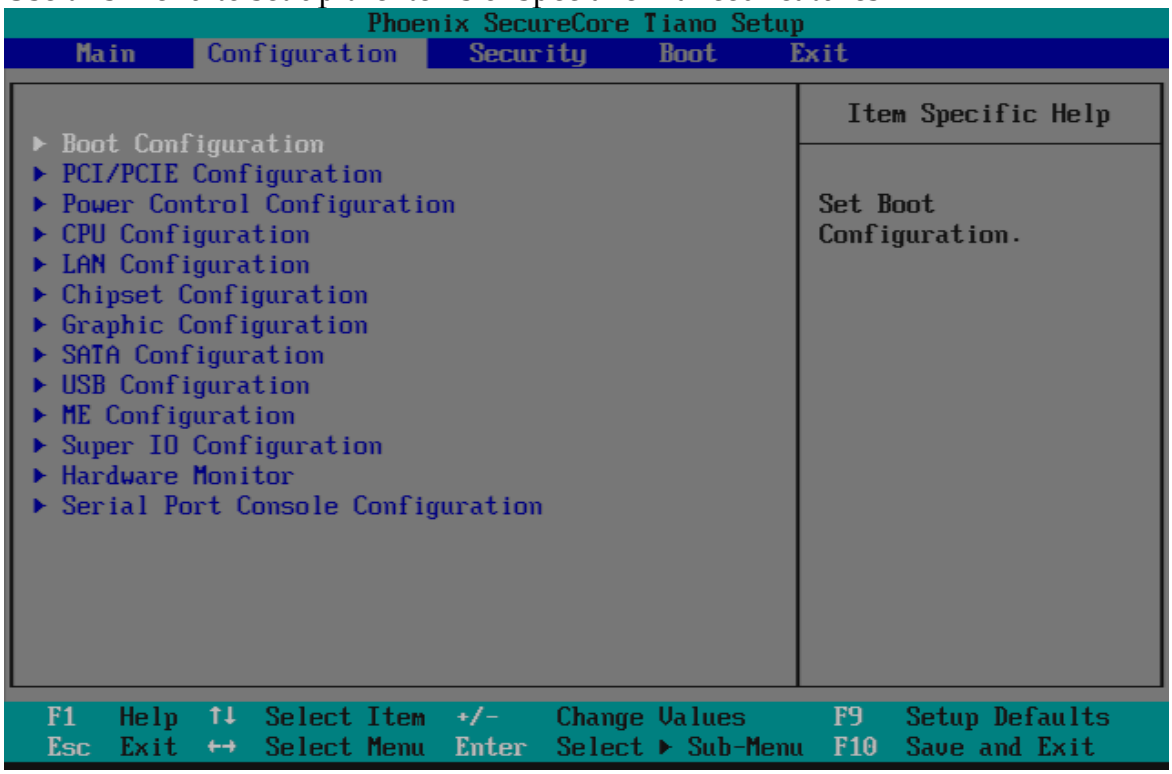
The date format is <Month>, <Day> and <Year>. Use [+] or [−] to configure system Date.

**System Time**

The time format is <Hour>, <Minute> and <Second>. Use [+] or [−] to configure system Time.

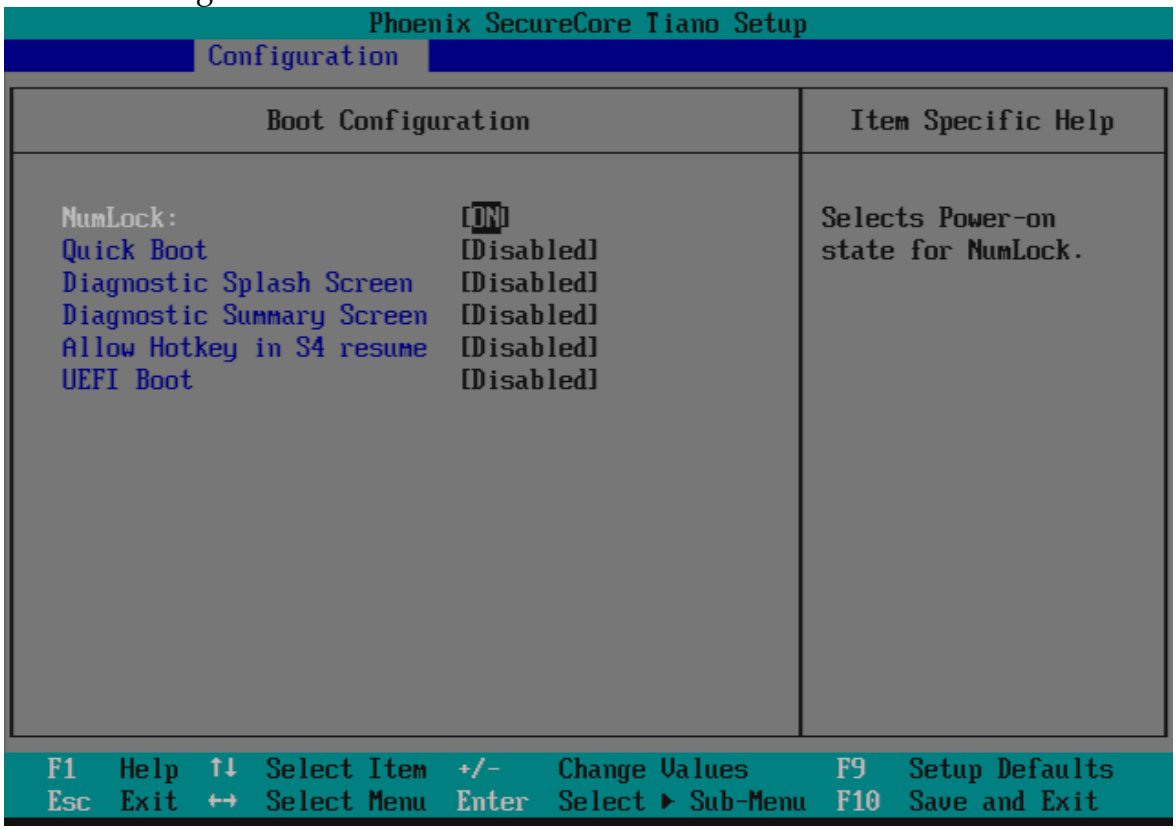
## 4.3 Configuration

Use this menu to set up the items of special enhanced features




**Boot Configuration**

Set boot configuration.


Phoenix SecureCore Tiano Setup
Configuration
Boot Configuration
Item Specific Help
NumLock: [ON]
Quick Boot [Disabled]
Diagnostic Splash Screen [Disabled]
Diagnostic Summary Screen [Disabled]
Allow Hotkey in S4 resume [Disabled]
UEFI Boot [Disabled]
Selects Power-on state for NumLock.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**NumLock:**
Selects Power-on state for NumLock.
Choices: OFF, ON.

**Quick Boot**
Enable/Disable quick boot.
Choices: Disabled, Enabled.

**Diagnostic Splash Screen**
If you select 'Enabled' the diagnostic splash screen always displays during boot. If you select 'Disabled' the diagnostic splash screen does not displays unless you press HOTKEY during boot.
Choices: Disabled, Enabled.

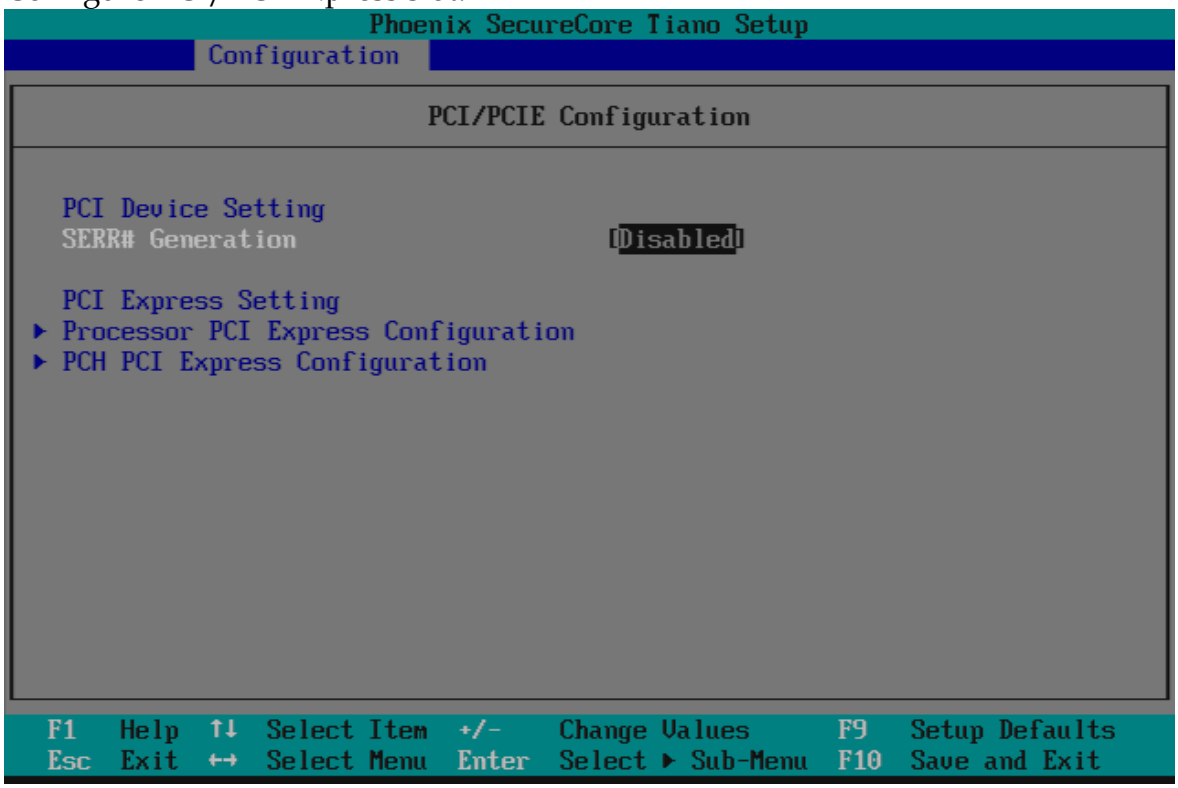
**Diagnostic Summary Screen**
Display the Diagnostic summary screen during boot.
Choices: Disabled, Enabled.

**Allow Hotkey in S4 resume**
Enable hotkey detection when system resuming from Hibernate state.
Choices: Disabled, Enabled.

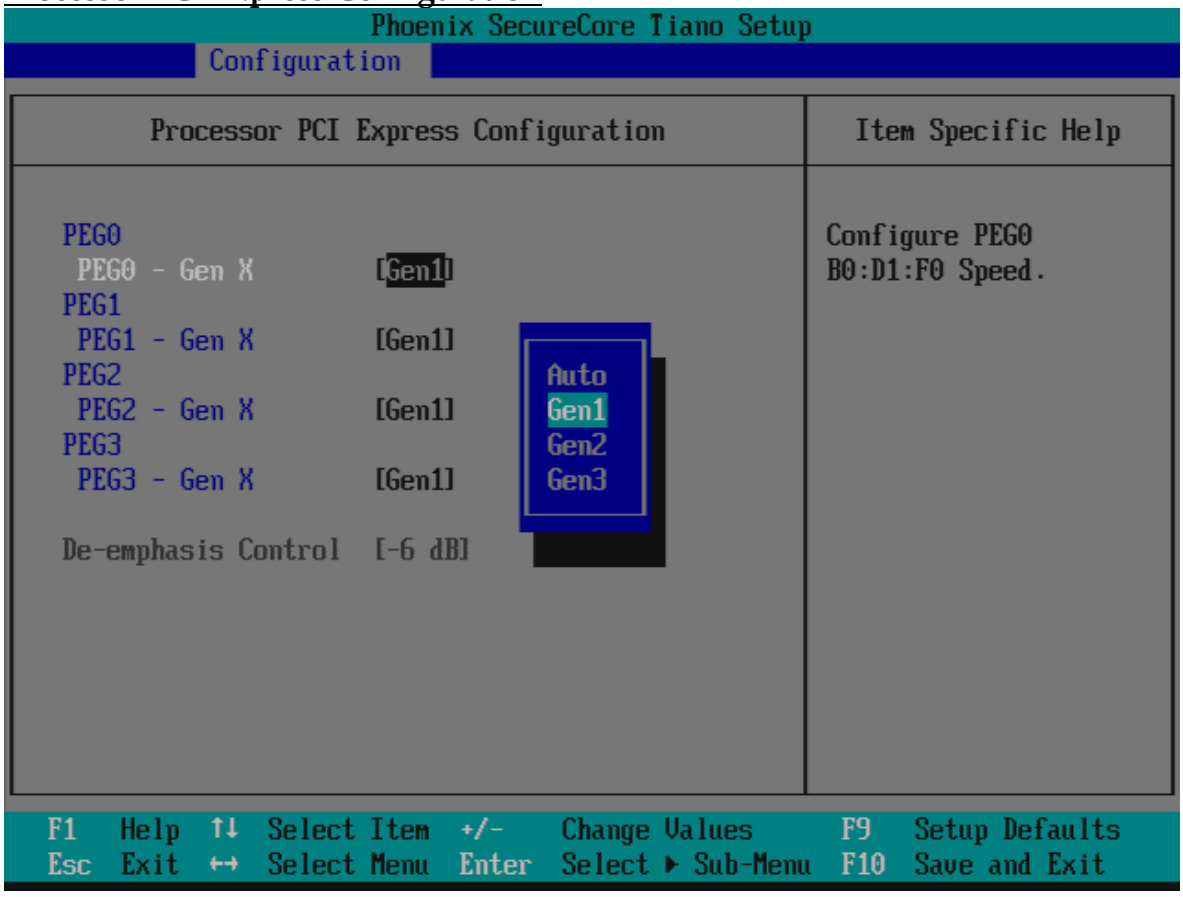
**UEFI Boot**
Enable the UEFI boot.
Choices: Disabled, Enabled.

## PCI/PCIE Configuration

Configure PCI/PCI Express slot.


Phoenix SecureCore Tiano Setup
Configuration
PCI/PCIE Configuration
PCI Device Setting
SERR# Generation [Disabled]
PCI Express Setting
Processor PCI Express Configuration
PCH PCI Express Configuration
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

## Processor PCI Express Configuration



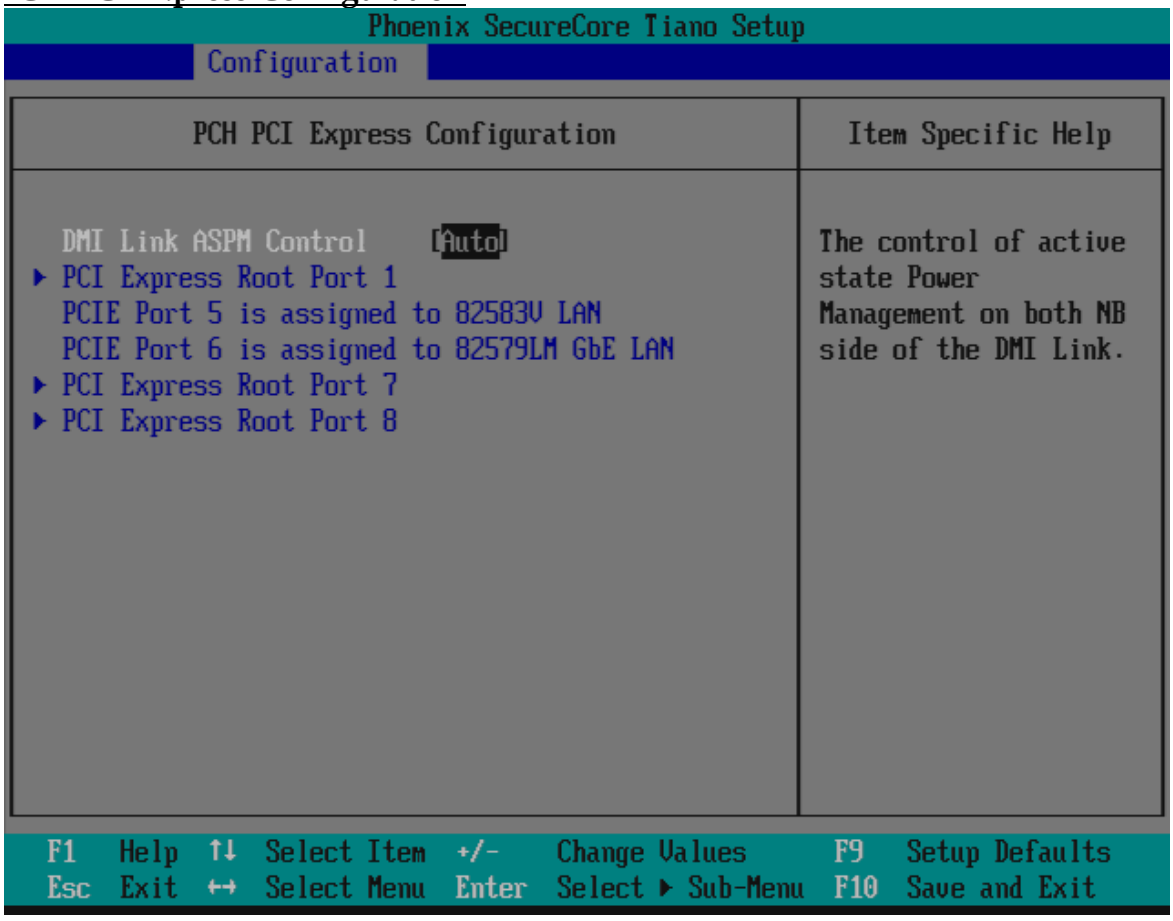
**FEG0 PEG0 – Gen X**
Configure PFG0 B0:D0:F0 Speed.
Choices: Auto, Gen1, Gen2, Gen3

**FEG1 PEG1 – Gen X**
Configure PFG1 B0:D0:F1 Speed.
Choices: Auto, Gen1, Gen2, Gen3

**FEG2 PEG2 – Gen X**
Configure PFG2 B0:D0:F2 Speed.
Choices: Auto, Gen1, Gen2, Gen3

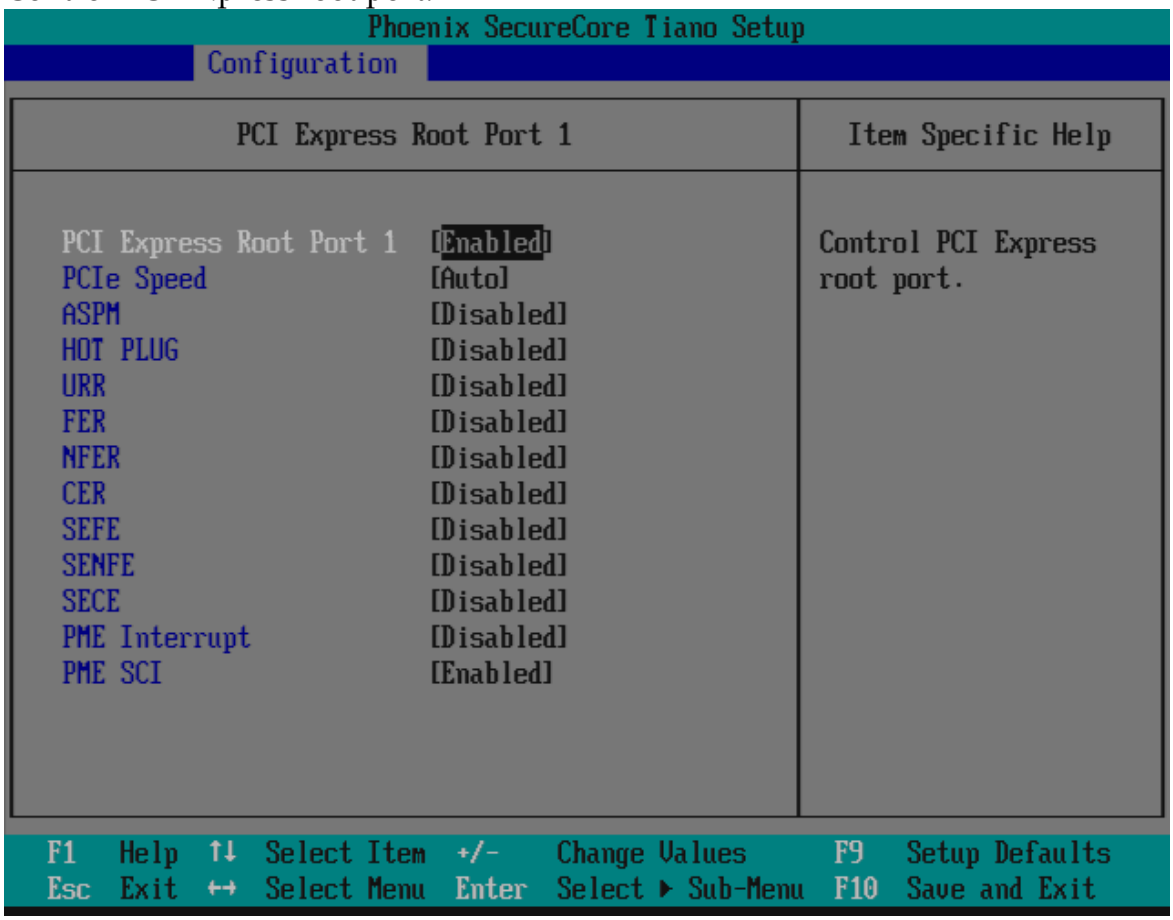
**FEG3 PEG3 – Gen X**
Configure PFG3 B0:D0:F3 Speed.
Choices: Auto, Gen1, Gen2, Gen3

**ICH PCI Express Configuration**


Phoenix SecureCore Tiano Setup
Configuration
PCH PCI Express Configuration
Item Specific Help
DMI Link ASPM Control [Auto]
PCI Express Root Port 1
PCIE Port 5 is assigned to 82583V LAN
PCIE Port 6 is assigned to 82579LM GbE LAN
PCI Express Root Port 7
PCI Express Root Port 8
The control of active state Power Management on both NB side of the DMI Link.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**DMI Link ASPM Control**
The control of active state Power Management on both NB side of the DMI Link.
Choices: Disabled, L0s, L1, L0sL1 and Auto.

**PCI Express Root Port 1, 7, 8**
Control PCI Express root port.




**PCI Express Root Port 1, 7, 8**
Control PCI Express root port.
Choices: Disabled, Enabled.

**PCIe Speed**
Select PCIe Speed to Gen1 or Gen2.
Choices: Auto, Gen1, Gen2.

**ASPM**
Control PCIe Active State Power Management settings.
Choices: Disabled, L0S, L1, L0S and L1, Auto.

**HOT PLUG**
PCI Express Hot Plug Enabled/Disabled.
Choices: Disabled, Enabled.

**URR**
PCI Express Unsupported Request Reporting Enable/Disable.
Choices: Disabled, Enabled.

**FER**
PCI Express Device Fatal Error Reporting Enable/Disable.
Choices: Disabled, Enabled.

**NFER**
PCI Express Device Non-Fatal Error Reporting Enable/Disable.
Choices: Disabled, Enabled.

**CER**
PCI Express Device Correctable Error Reporting Enable/Disable.
Choices: Disabled, Enabled.

**SEFE**
Root PCI Express System Error on Fatal Error Enable/Disable.
Choices: Disabled, Enabled.

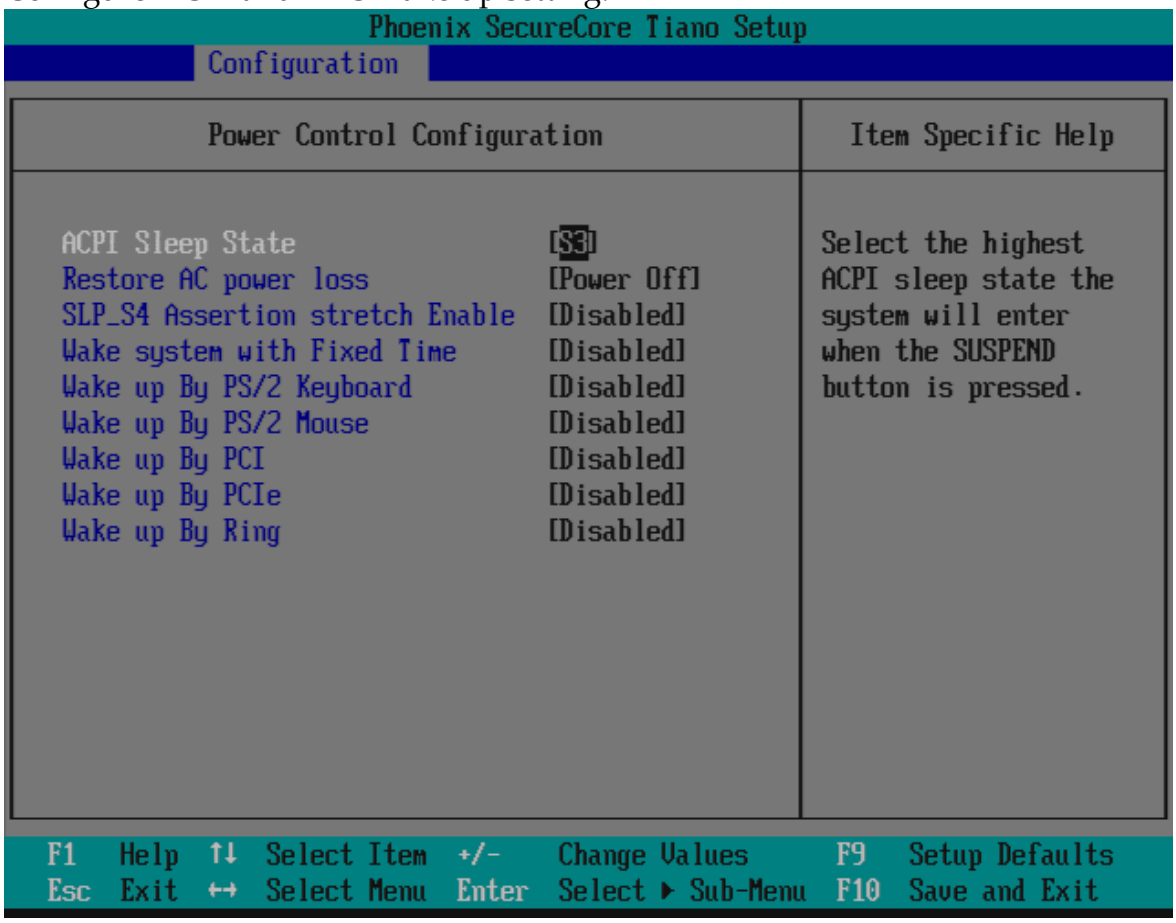
**SENFE**
Root PCI Express System Error on Non-Fatal Error Enable/Disable.
Choices: Disabled, Enabled.

**SECE**
Root PCI Express System Error on Correctable Error Enable/Disable.
Choices: Disabled, Enabled.

**PME Interrupt**
Root PCI Express PME Interrupt Enable/Disable.
Choices: Disabled, Enabled.

**PME SCI**
PCI Express PME SCI
Choices: Disabled, Enabled.

**Power Control Configuration**
Configure ACPI and RTC wake up setting.


Phoenix SecureCore Tiano Setup
Configuration
Power Control Configuration
Item Specific Help
ACPI Sleep State [S3]
Restore AC power loss [Power Off]
SLP_S4 Assertion stretch Enable [Disabled]
Wake system with Fixed Time [Disabled]
Wake up By PS/2 Keyboard [Disabled]
Wake up By PS/2 Mouse [Disabled]
Wake up By PCI [Disabled]
Wake up By PCIe [Disabled]
Wake up By Ring [Disabled]
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

**ACPI Sleep State**
Select the highest APCI sleep state the system will enter when the SUSPEND button is pressed.
Choices: S1, S3.

**Restore AC Power Loss**
Select AC Power state when power is re-applied after a power failure.
Choices: Power Off, Power On, Last State.

**SLP_S4 Assertion stretch Enable**
Choices: Disabled, Enabled

**Wake system with Fixed Time**
Enable or disable system wake on alarm event. When Enabled, system will wake on the hr: min: sec specified.
Choices: Disabled, Enabled

**Wake up By PS/2 Keyboard**
Choices: Enabled, Disabled.

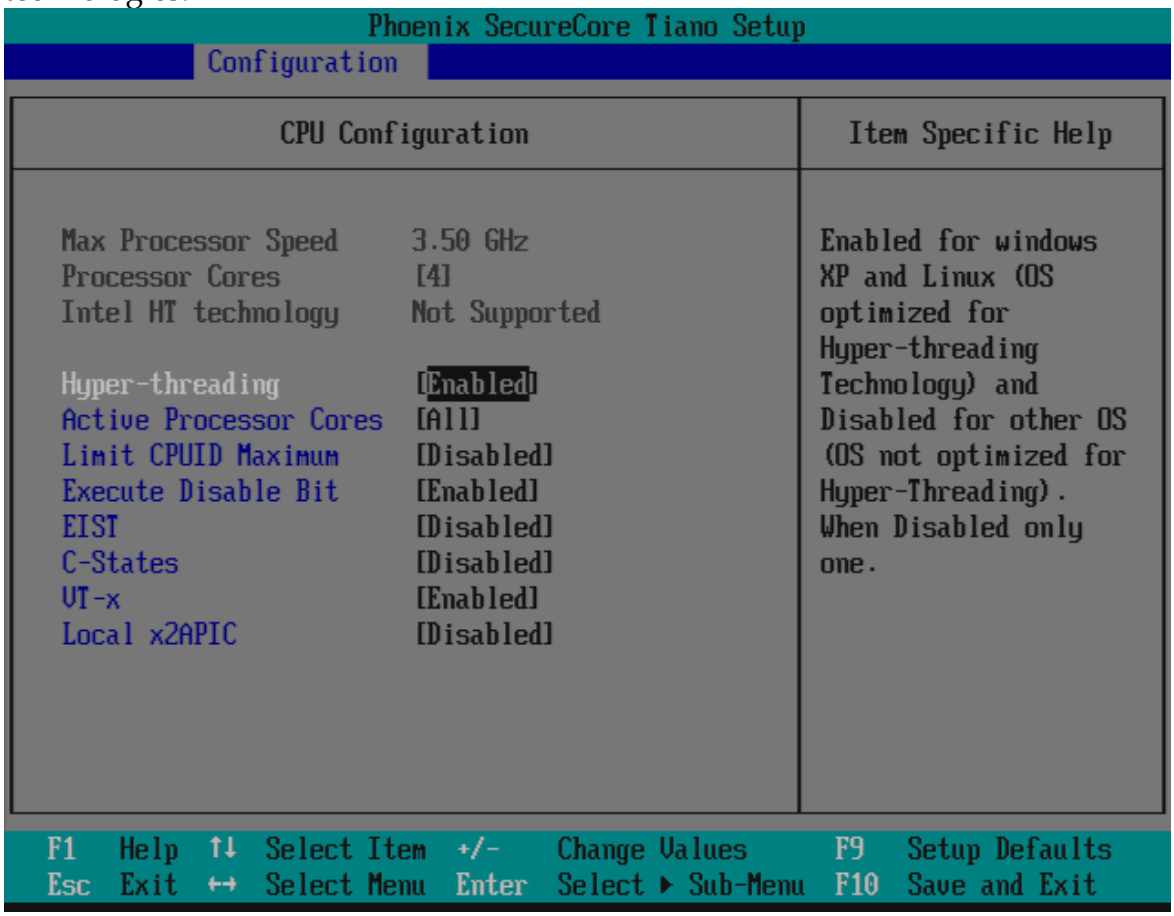
**Wake up By PS/2 Mouse**
Choices: Enabled, Disabled.

**Wake up By PCI**
Choices: Enabled, Disabled.

**Wake up By PCIe**
Choices: Enabled, Disabled.

**Wake up By Ring**
Choices: Enabled, Disabled.

**CPU configuration**
Configure the specific active core(s) and advanced processor management technologies.


Phoenix SecureCore Tiano Setup
Configuration
CPU Configuration
Item Specific Help
Max Processor Speed 3.50 GHz
Processor Cores [4]
Intel HT technology Not Supported
Hyper-threading [Enabled]
Active Processor Cores [All]
Limit CPUID Maximum [Disabled]
Execute Disable Bit [Enabled]
EIST [Disabled]
C-States [Disabled]
VT-x [Enabled]
Local x2APIC [Disabled]
Enabled for windows XP and Linux (OS optimized for Hyper-threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading). When Disabled only one.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Hyper-Threading**
Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When disabled only one.
Choices: Disabled, Enabled.

**Active Processor Cores**
Select the number of physical cores to enable in each processor package.
Choices: All, 1, 2, 3.

**Limit CPUID Maximum**
Disabled for Windows XP.
Choices: Disabled, Enabled.

**Execute Disabled Bit**
Enabled Execute Disabled functionality. Also known as Data Execution Prevention (DEP).
Choices: Disabled, Enabled.

**EIST**
Selects Disabled or Enabled for Enhanced Intel SpeedStep Technology.
Choices: Disabled, Enabled.

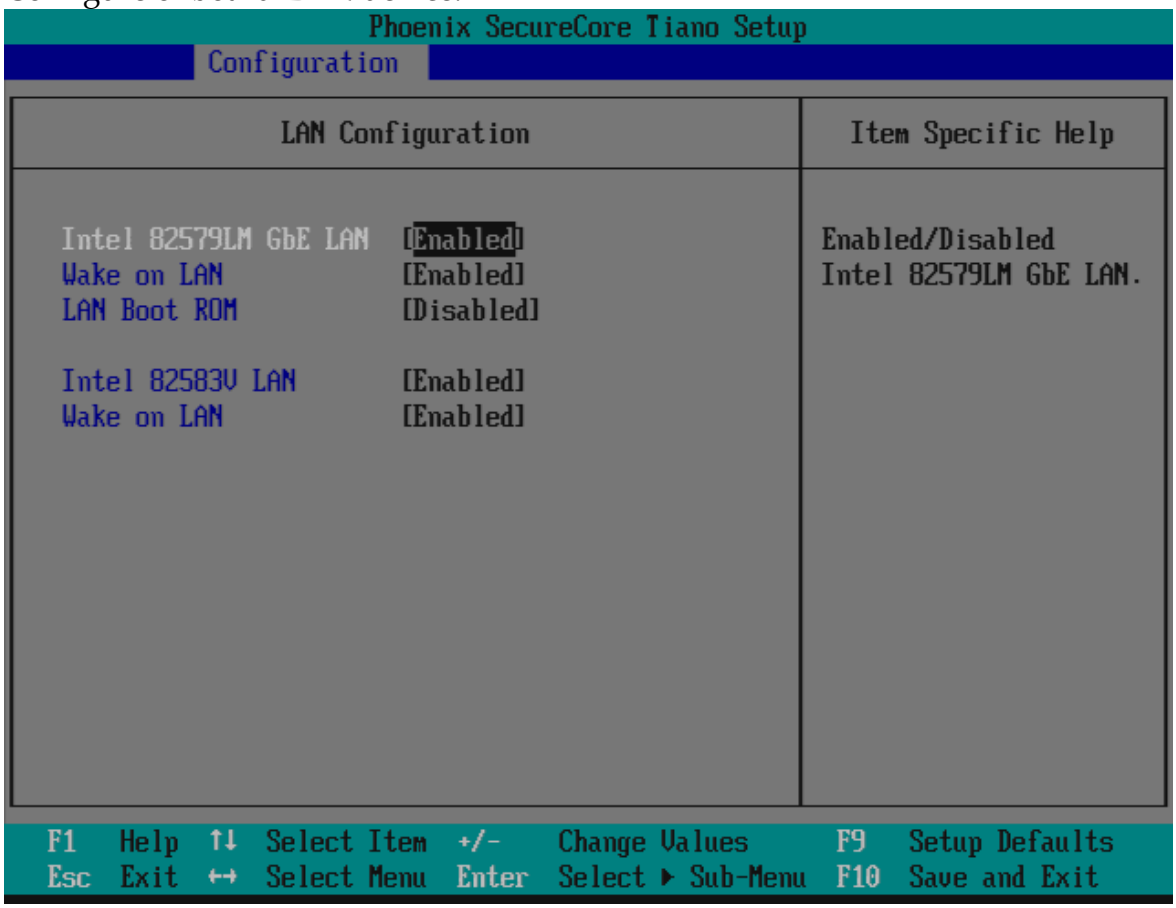
**C-States**
Selects Disabled or Enabled for CPU operating states.
Choices: Disabled, Enabled.

**VT-x**
When enabled, a VWM can utilize the additional hardware capabilities provided by Vander pool Technology.
Choices: Disabled, Enabled.

**Local x2APIC**
Selects Disabled or Enabled for Advanced Programmable Interrupt Controller.
Choices: Disabled, Enabled.

**LAN Configuration**

Configure onboard LAN device.


Phoenix SecureCore Tiano Setup
Configuration
LAN Configuration
Item Specific Help
Intel 82579LM GbE LAN [Enabled]
Wake on LAN [Enabled]
LAN Boot ROM [Disabled]
Intel 82583V LAN [Enabled]
Wake on LAN [Enabled]
Enabled/Disabled
Intel 82579LM GbE LAN.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

**Intel 82579LM GbE LAN**

Enabled/Disabled Intel 82579LM GbE LAN.
Choices: Disabled, Enabled.

**Wake on LAN**

Enabled/Disabled Wake on LAN Function.
Choices: Disabled, Enabled.

**LAN Boot ROM**

Control LAN Boot ROM (PXE) function.
Choices: Disabled, Enabled.

**Intel 82583V LAN**

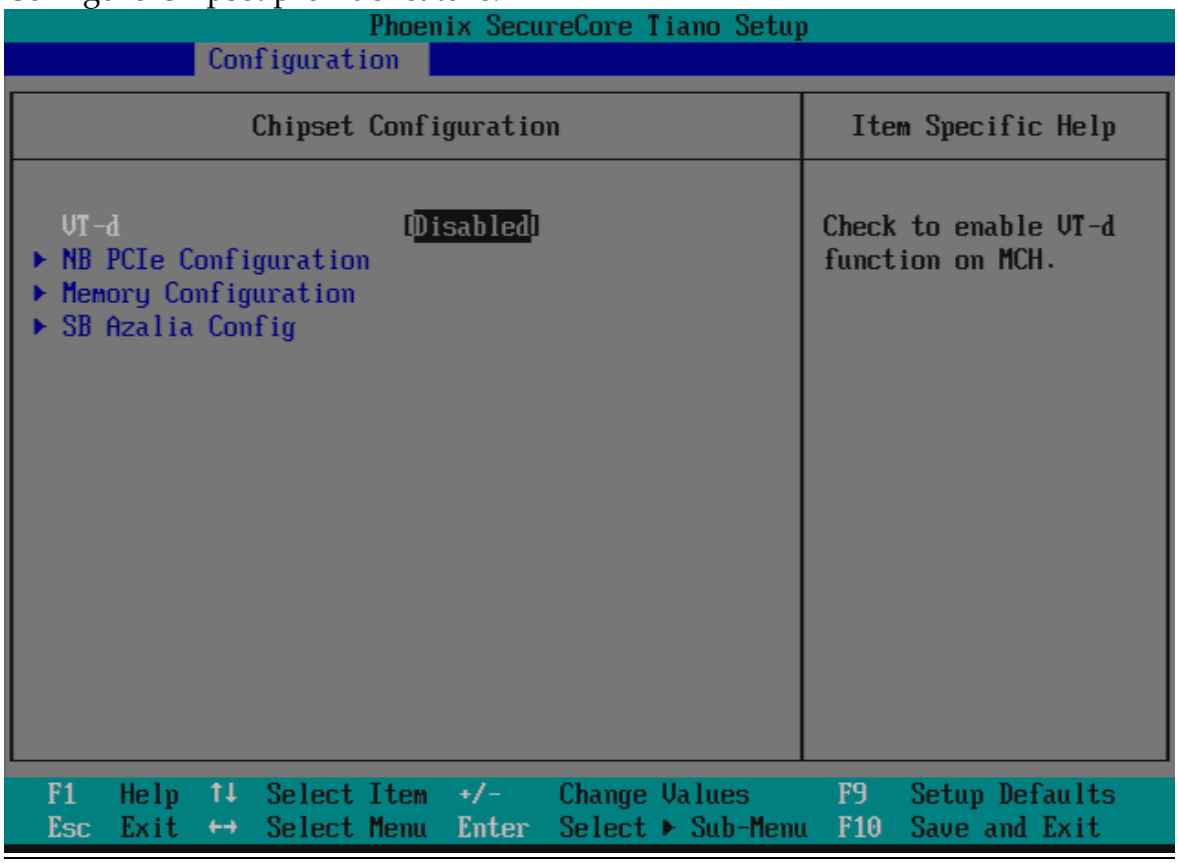
Enabled/Disabled 82583V LAN.
Choices: Disabled, Enabled.

**Wake on LAN**

Enabled/Disabled Wake on LAN Function.
Choices: Disabled, Enabled.

## Chipset Configuration

Configure Chipset provide feature.

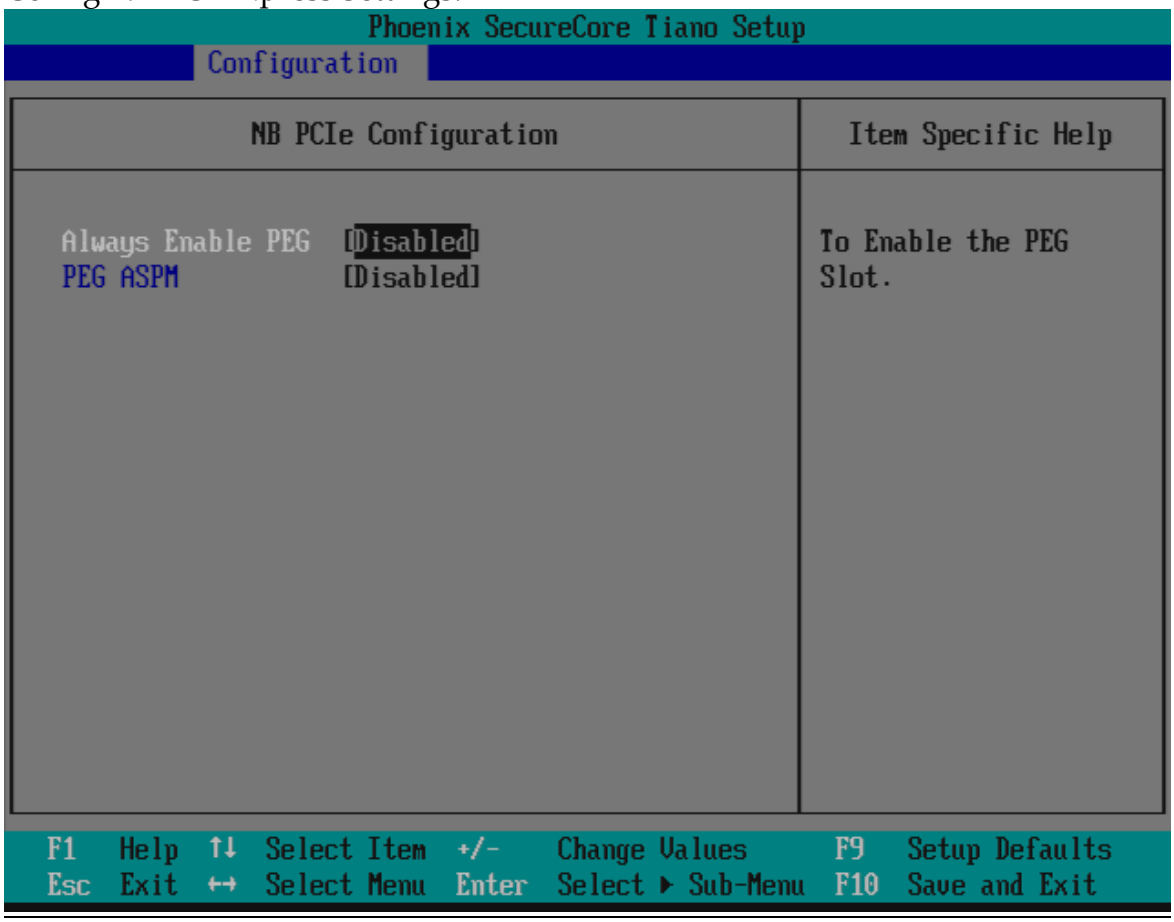

Phoenix SecureCore Tiano Setup
Configuration
Chipset Configuration
Item Specific Help
VT-d
[Disabled]
Check to enable VT-d function on MCH.
NB PCIe Configuration
Memory Configuration
SB Azalia Config
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

## VT-d

Check to enable VT-d function on MCH.
Choices: Disabled, Enabled.

**NB PCIe Configuration**

Config NB PCI Express Settings.


Phoenix SecureCore Tiano Setup
Configuration
NB PCIe Configuration
Item Specific Help
Always Enable PEG [Disabled]
PEG ASPM [Disabled]
To Enable the PEG Slot.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Always Enable PEG**

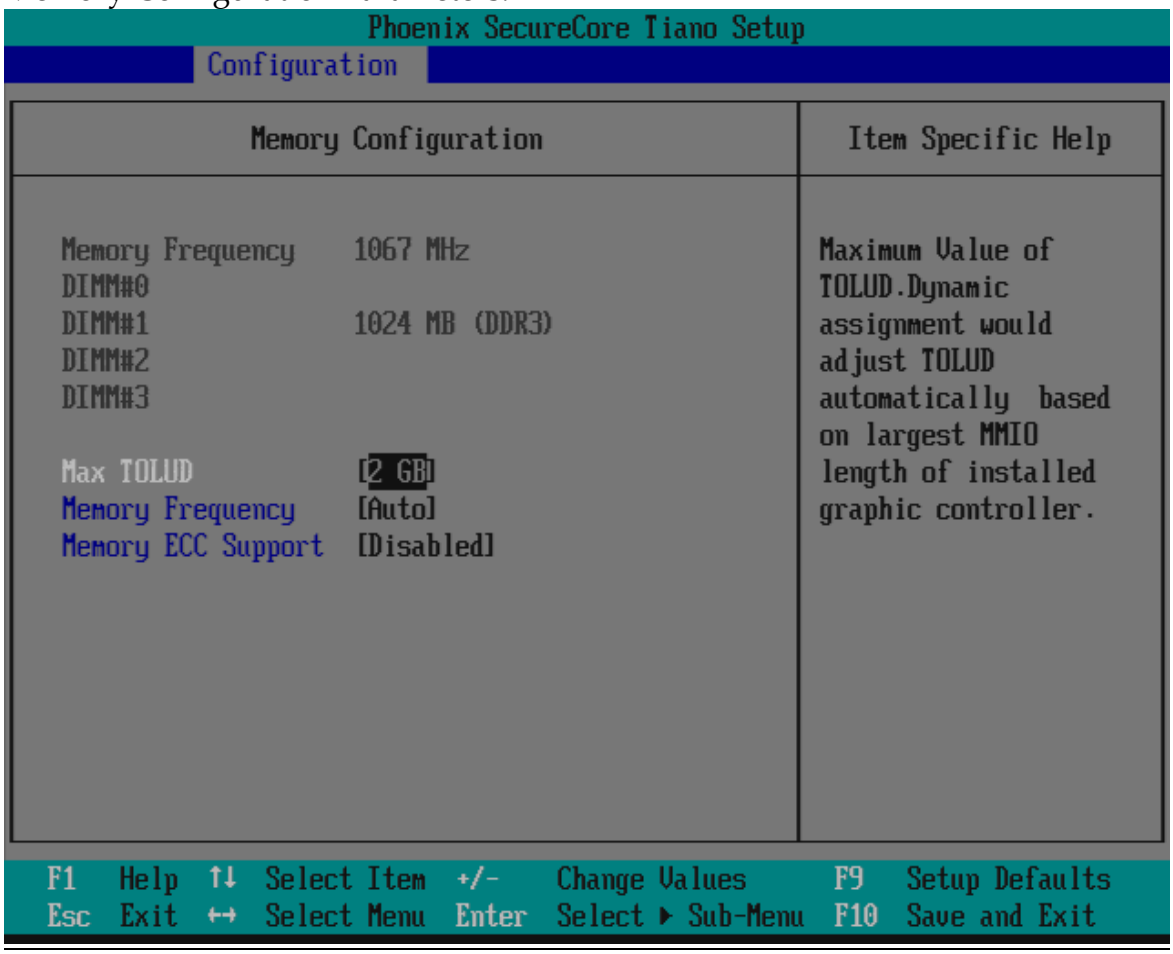
To Enable the PEG Slot.
Choices: Disabled, Enabled.

**PEG ASPM**

Control ASPM (Active State Power Management) Support for the PEG Device. This has mp effect if PEF is not the current active service.
Choices: Disabled, Auto, ASPM L0s, ASPM L1, ASPM L0sL1.
Choices: Enabled, Disabled.

## Memory Configuration

Memory Configuration Parameters.


Phoenix SecureCore Tiano Setup
Configuration
Memory Configuration
Item Specific Help
Memory Frequency 1067 MHz
DIMM#0
DIMM#1 1024 MB (DDR3)
DIMM#2
DIMM#3
Max TOLUD [2 GB]
Memory Frequency [Auto]
Memory ECC Support [Disabled]
Maximum Value of TOLUD.Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

## Max TOLUD

Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
Choices: Dynamic, 1GB, 1.25GB, 1.5GB, 1.75GB, 2GB, 2.25GB, 2.5GB, 2.75GB, 3GB, 3.25GB, 3.5GB.

## Memory Frequency

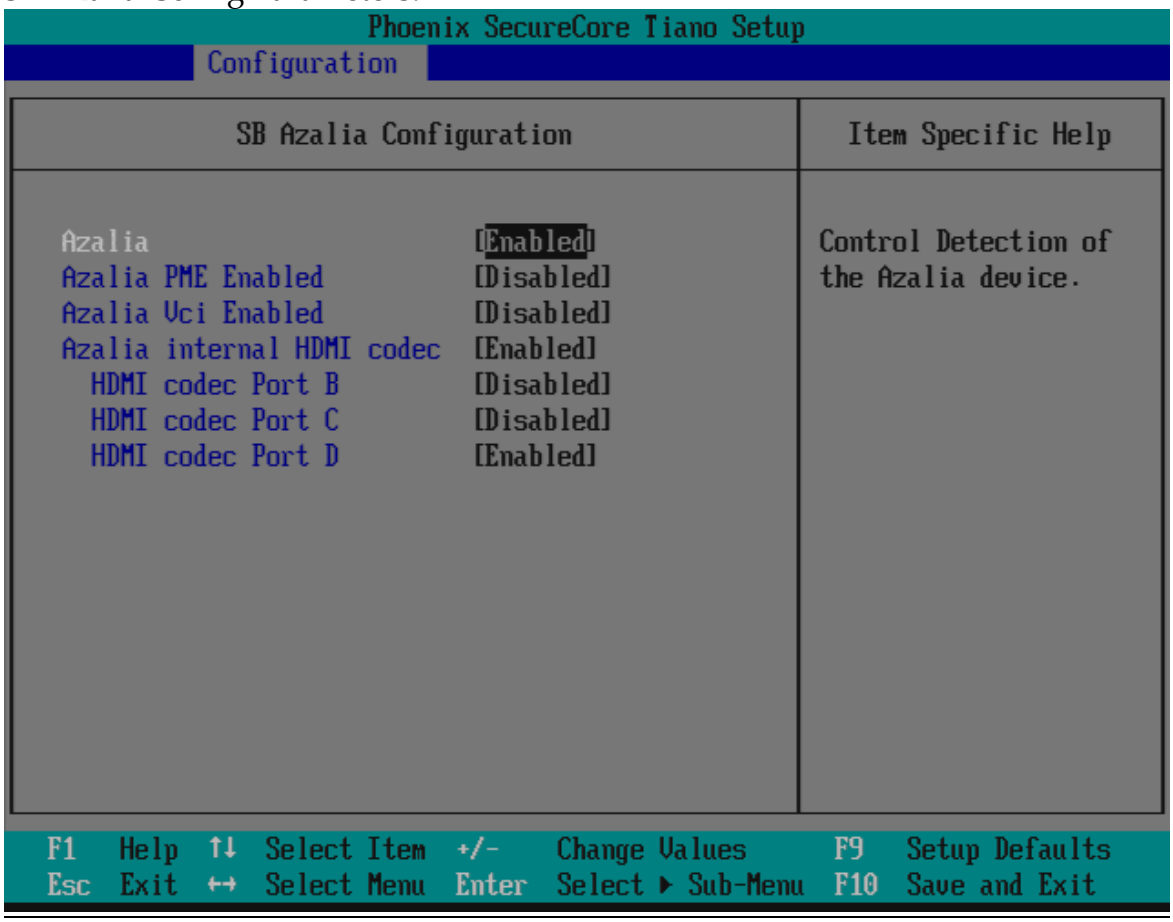
Maximum Memory Frequency Selections in Mhz.
Choices: Auto, 1067, 1333, 1600, 1867, 2133.

## Memory ECC Support

Selects ECC memory function Disable/Enable.
Choices: Disable, Enable.

## SB Azalia Configuration

SB Azalia Config Parameters.


Phoenix SecureCore Tiano Setup
Configuration
SB Azalia Configuration
Item Specific Help
Azalia [Enabled]
Azalia PME Enabled [Disabled]
Azalia Vci Enabled [Disabled]
Azalia internal HDMI codec [Enabled]
HDMI codec Port B [Disabled]
HDMI codec Port C [Disabled]
HDMI codec Port D [Enabled]
Control Detection of the Azalia device.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

### Azalia

Control detection of the Azalia device.
Choices: Disable, Enable.

### Azalia PME Enable

Choices: Disable, Enable.

### Azalia Vci Enable

Choices: Disable, Enable.

### Azalia Internal HDMI codec

Choices: Disable, Enable.

### HDMI codec Port B

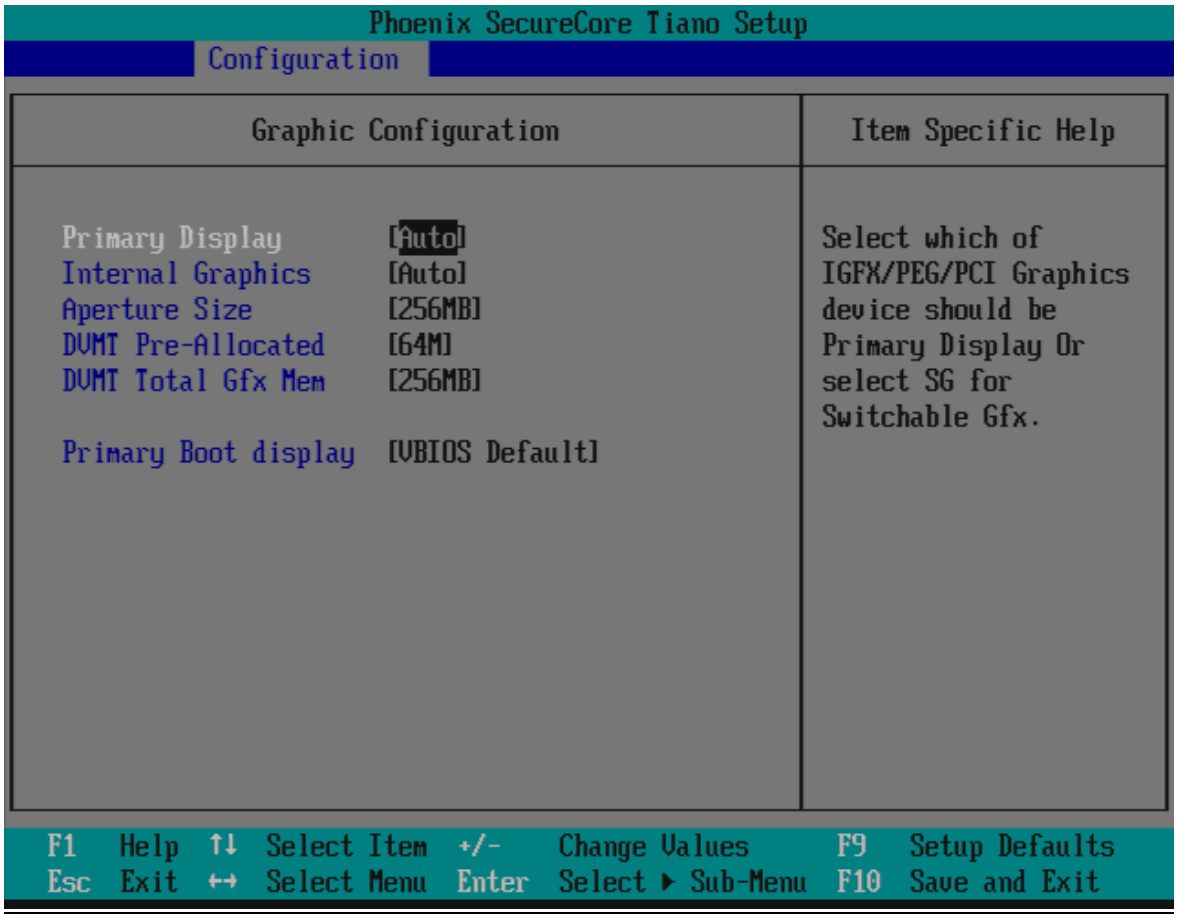
Choices: Disable, Enable.

### HDMI codec Port C

Choices: Disable, Enable.

**HDMI codec Port D**
Choices: Disable, Enable.

**Graphic Configuration**
Configure integrated Graphic like Boot display, video memory and external Graphic feature.


Phoenix SecureCore Tiano Setup
Configuration
Graphic Configuration
Item Specific Help
Primary Display [Auto]
Internal Graphics [Auto]
Aperture Size [256MB]
DVMT Pre-Allocated [64M]
DVMT Total Gfx Mem [256MB]
Primary Boot display [VBIOS Default]
Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Primary Display**
Select which of IGFX/PEG/PCI Graphics device should be Primary Display or select SG for Switchable Gfx.
Choices: Auto, IGFX, PEG and PCI.

**Internal Graphics**
Keep IGD Enabled Based on the setup options,
Choices: Auto, Disabled, Enabled.

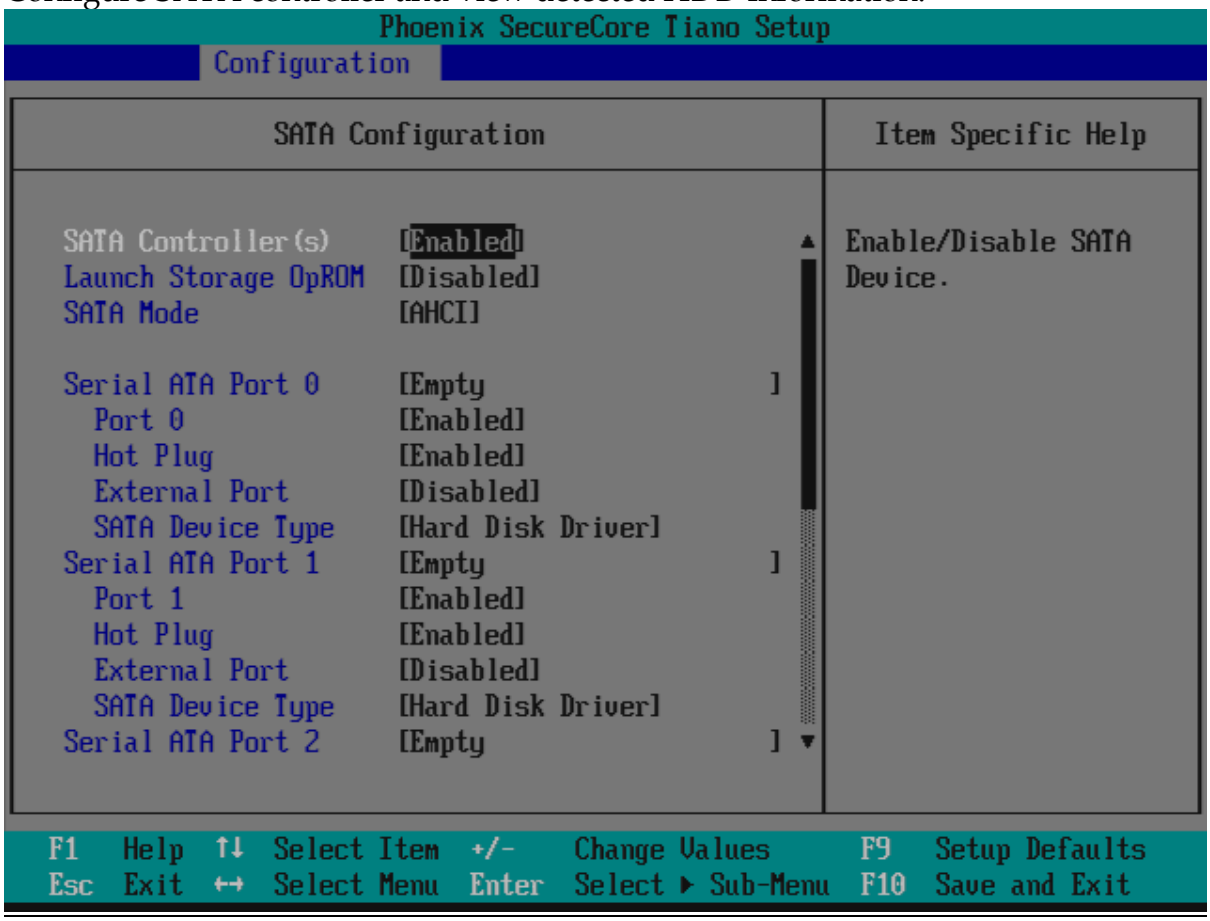
**Aperture Size**
Select the Aperture Size
Choices: 128MB, 256MB, 512MB.

**DVMT Pre-Allocated**
Select DVMT 5.0 Pre-Allocated Graphics Memory size used by the Internal Graphics Device.
Choices: 0M, 32M, 64M, 96M, 128M, 160M, 192M, 224M, 256M, 288M, 320M , 352M, 384M, 416M, 448M, 480M, 512M.

**DVMT Total Gfx Mem**
Select DVMT 5.0 Total Graphics Memory size used by the Internal Graphics Device.
Choices: 128MB, 256MB, MAX.

**Primay Boot display**
Choices: VBIOS Default, CRT, LFP, LFP2, EFP, EFP2, EFP3.

**SATA Configuration**
Configure SATA controller and view detected HDD Information.


Phoenix SecureCore Tiano Setup
Configuration
SATA Configuration
Item Specific Help
SATA Controller(s) [Enabled]
Launch Storage OpROM [Disabled]
SATA Mode [AHCI]
Serial ATA Port 0 [Empty ]
Port 0 [Enabled]
Hot Plug [Enabled]
External Port [Disabled]
SATA Device Type [Hard Disk Driver]
Serial ATA Port 1 [Empty ]
Port 1 [Enabled]
Hot Plug [Enabled]
External Port [Disabled]
SATA Device Type [Hard Disk Driver]
Serial ATA Port 2 [Empty ]
Enable/Disable SATA Device.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**SATA Controller (s)**
Determines how SATA controllers (s) operate.
Choices: Disabled, Enabled.

**Launch Storage OpROM**
Enable or Disable Boot Option for Legacy Mass Storage Devices with Option ROM.
Choices: Enabled, Disabled.

**SATA Mode**
Determines how SATA controllers (s) operate.
Choices: Disabled, IDE, AHCI, and RAID.

**Serial ATA Port 0**
Display the identity of the device attached.
Choices: Empty.

**Port 0-4**
Enabled or Disabled SATA Port 0.
Choices: Disabled, Enabled.

**Hot Plug**
Designates this port as Hot Pluggable.
Choices: Disabled, Enabled.

**External Port**
External SATA Support.
Choices: Disabled, Enabled.

**SATA Device Type**
Select"Solid State Drive" only if a Solid State Drive is connected to this SATA port.
Choices: Hard Disk Driver, Solid State Drive.

**CFex**
Choices: Empty.

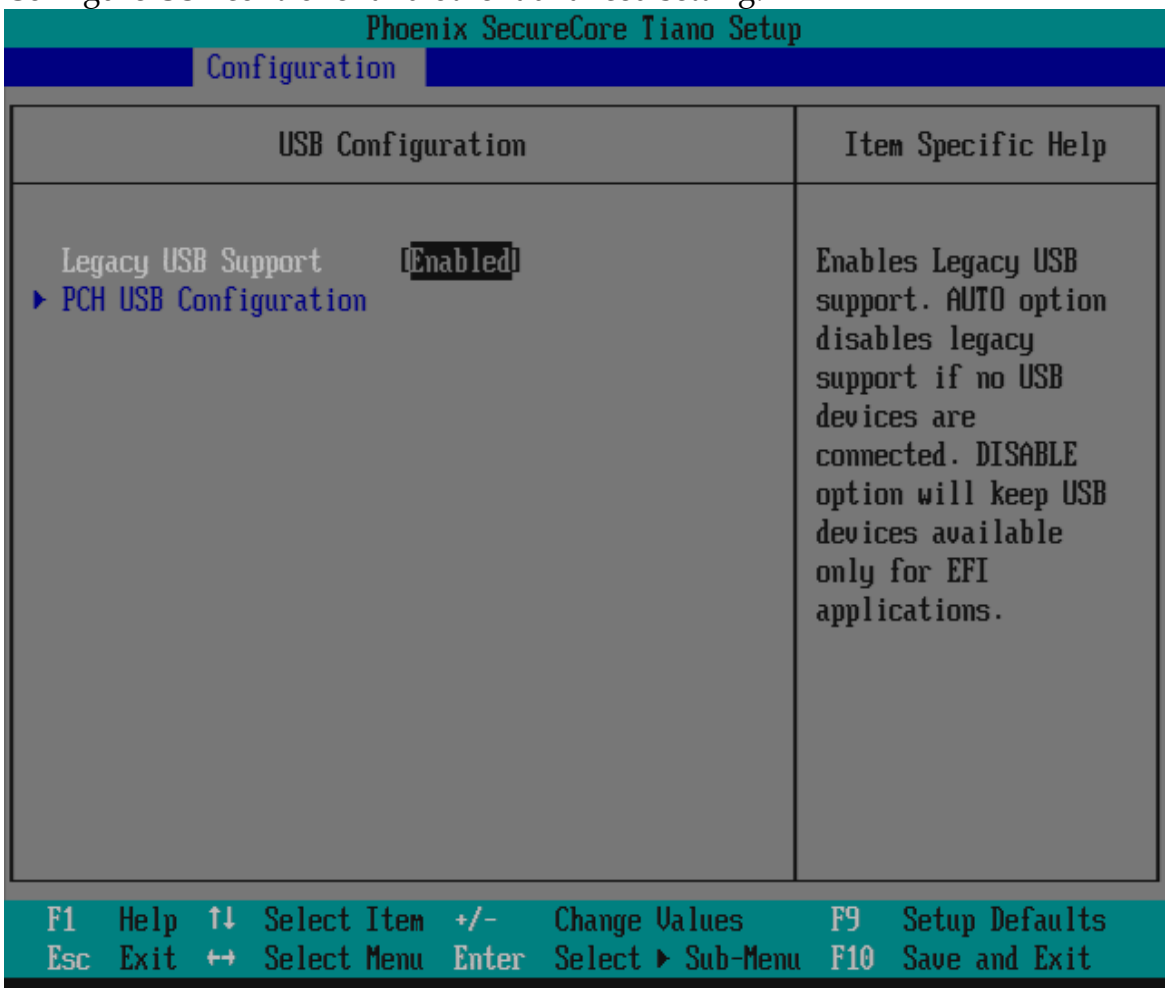
**CFex**
Enabled or Disabled CFex Port.
Choices: Disabled, Enabled.

**Hot Plug**
Designates this port as Hot Pluggable.
Choices: Disabled, Enabled.

**External Port**
External SATA Support.
Choices: Disabled, Enabled.

**USB Configuration**

Configure USB controller and other advanced setting.


Phoenix SecureCore Tiano Setup
Configuration
USB Configuration
Item Specific Help
Legacy USB Support [Enabled]
PCH USB Configuration
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

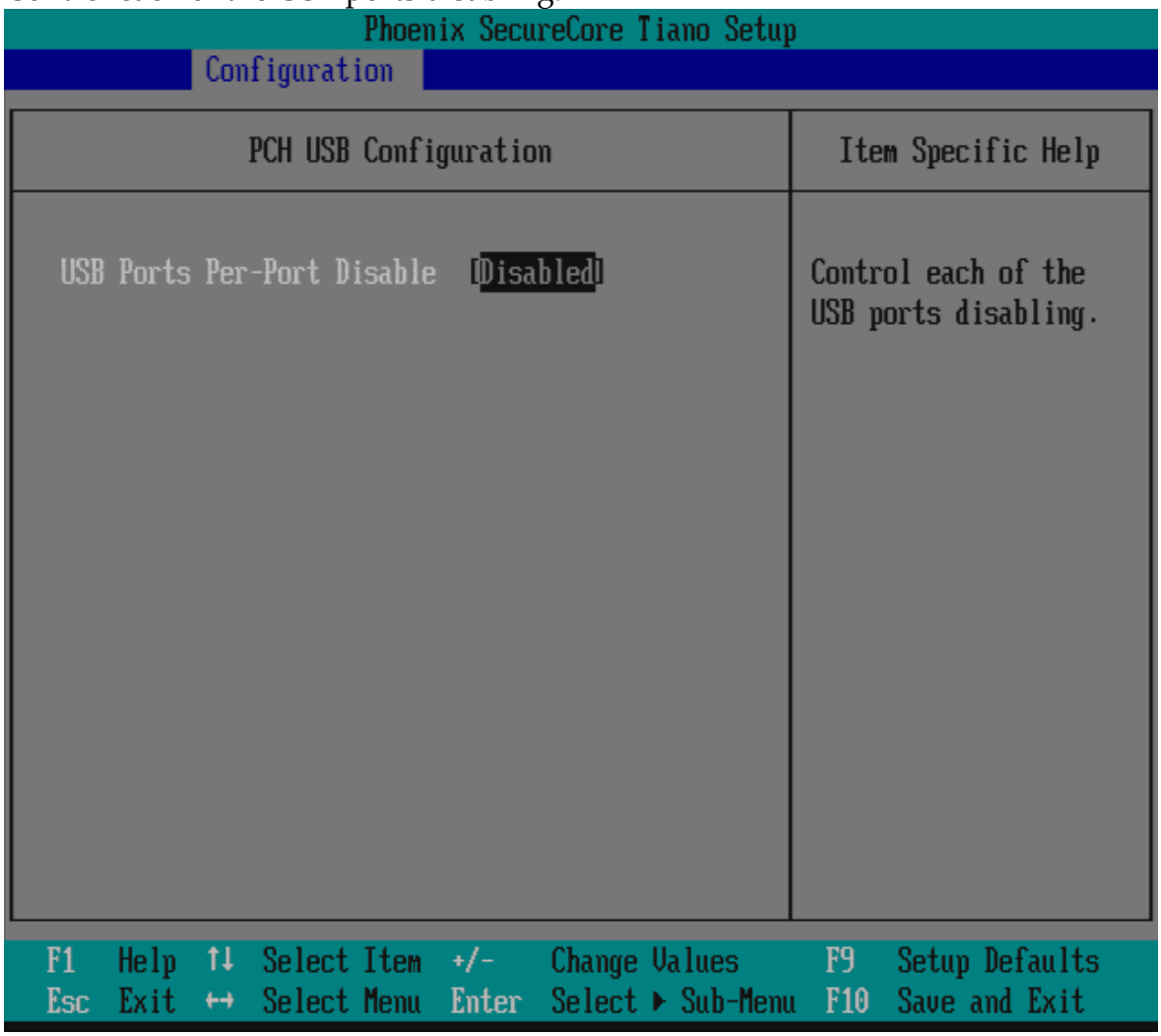
**Legacy USB Support**

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

Choices: Enabled, Disabled.

**PCH USB Configuration**

Control each of the USB ports disabling.


Phoenix SecureCore Tiano Setup
Configuration
PCH USB Configuration
Item Specific Help
USB Ports Per-Port Disable [Disabled]
Control each of the USB ports disabling.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

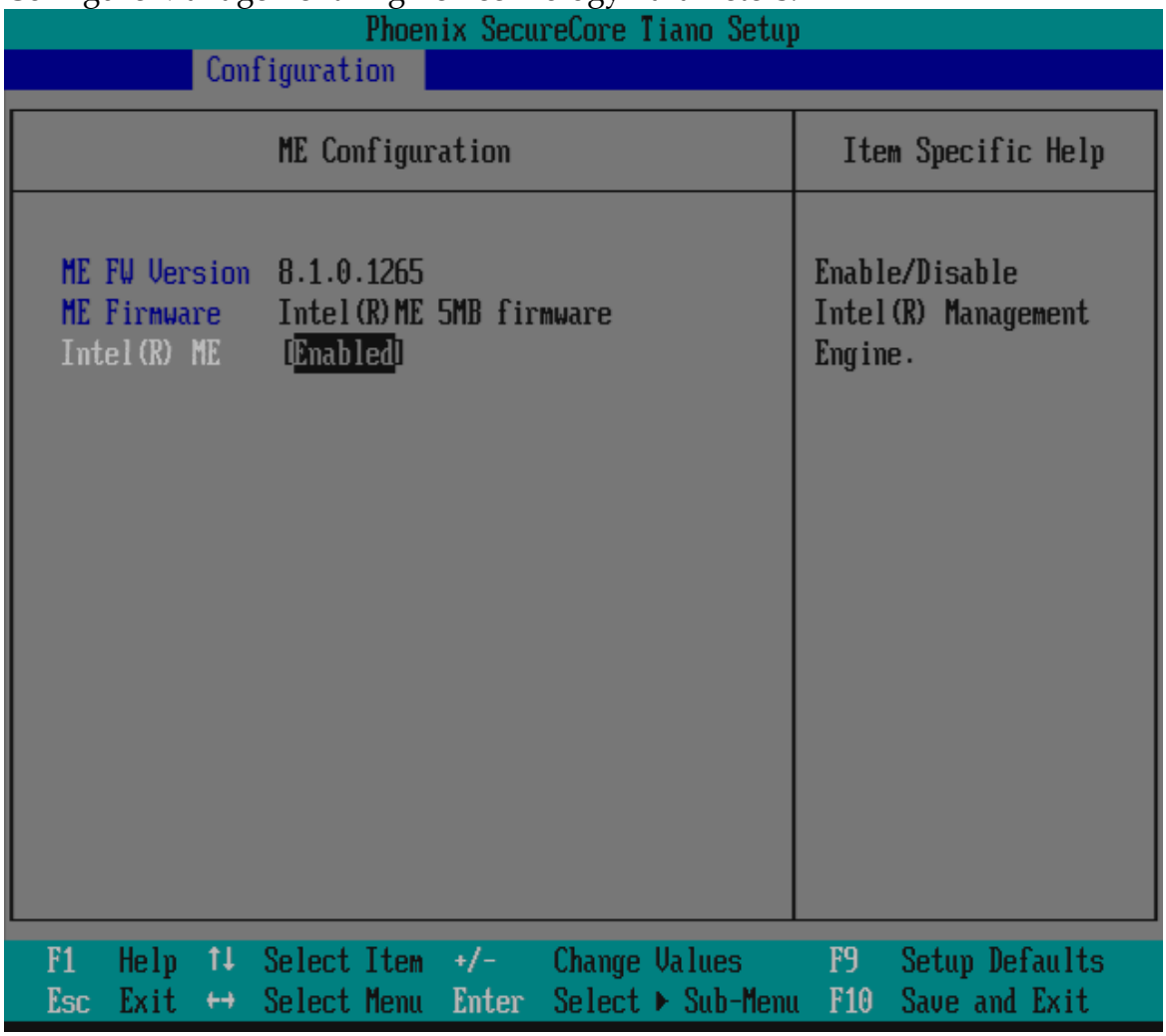
**USB Ports Per-Port Disable**

Control each of the USB ports disabling.

Choices: Enabled, Disabled.

**ME Configuration**

Configure Management Engine Technology Parameters.

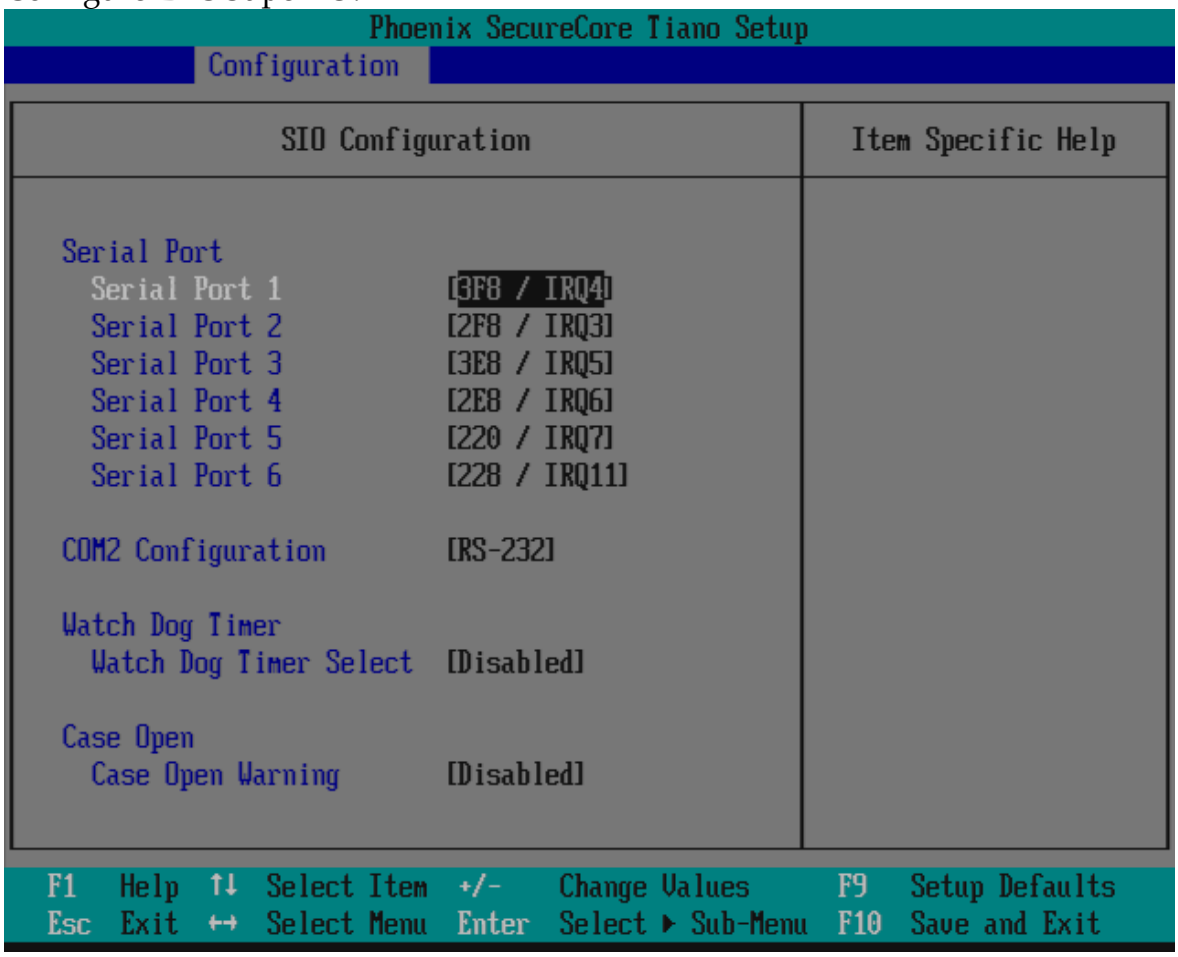

Phoenix SecureCore Tiano Setup
Configuration
ME Configuration
Item Specific Help
ME FW Version 8.1.0.1265
ME Firmware Intel(R)ME 5MB firmware
Intel(R) ME [Enabled]
Enable/Disable Intel(R) Management Engine.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Intel (R) ME**

Enable/Disable Intel (R) Management Engine.
Choices: Enabled, Disabled.

**Super IO Configuration**

Configure LPC Super IO.


Phoenix SecureCore Tiano Setup
Configuration
SIO Configuration
Item Specific Help
Serial Port
Serial Port 1 [3F8 / IRQ4]
Serial Port 2 [2F8 / IRQ3]
Serial Port 3 [3E8 / IRQ5]
Serial Port 4 [2E8 / IRQ6]
Serial Port 5 [220 / IRQ7]
Serial Port 6 [228 / IRQ11]
COM2 Configuration [RS-232]
Watch Dog Timer
Watch Dog Timer Select [Disabled]
Case Open
Case Open Warning [Disabled]
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Serial Port 1-6**

Choices: Disabled, 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ5, 2E8/IRQ6, 220/IRQ7, 228/IRQ11.

**COM2 Configuration**

Select Com2 Configuration.
Choices: RS-232, RS-422, RS-485.

**Watch Dog Timer Select**

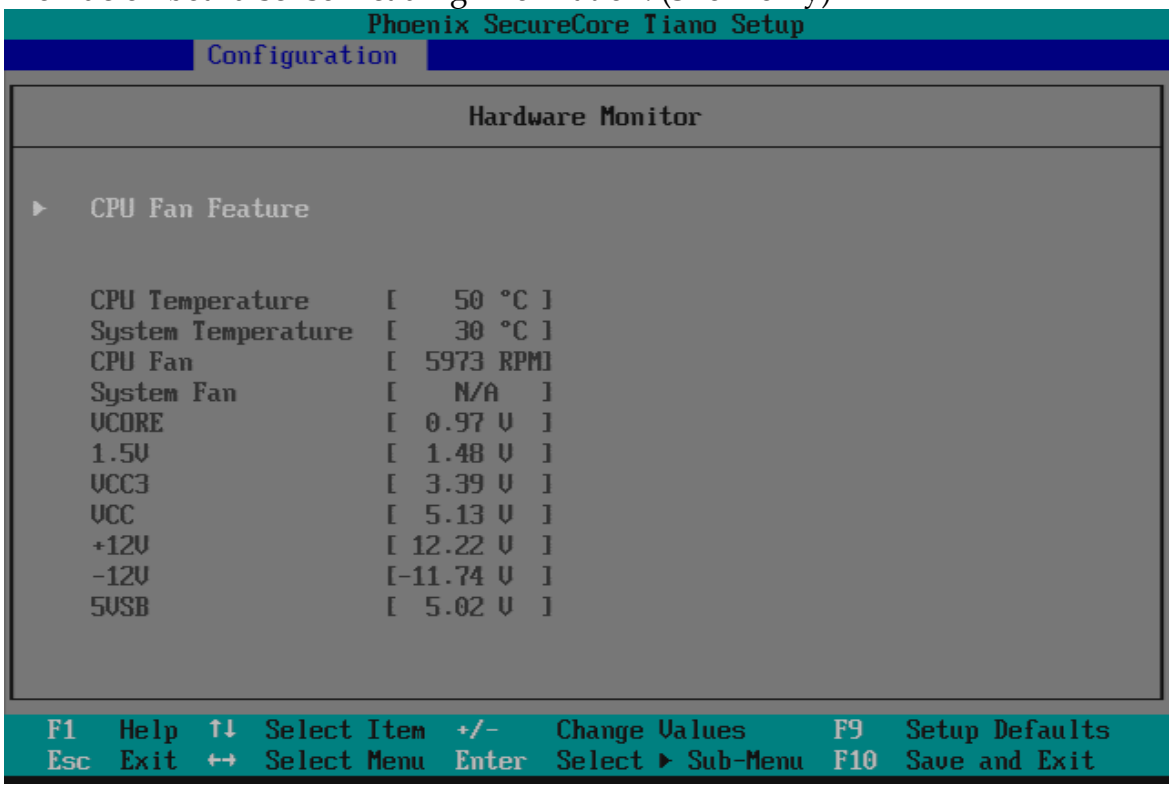
Choices: Disabled, 30 secs, 1 min, 2 mins and 3 mins.

**Case Open Warning**

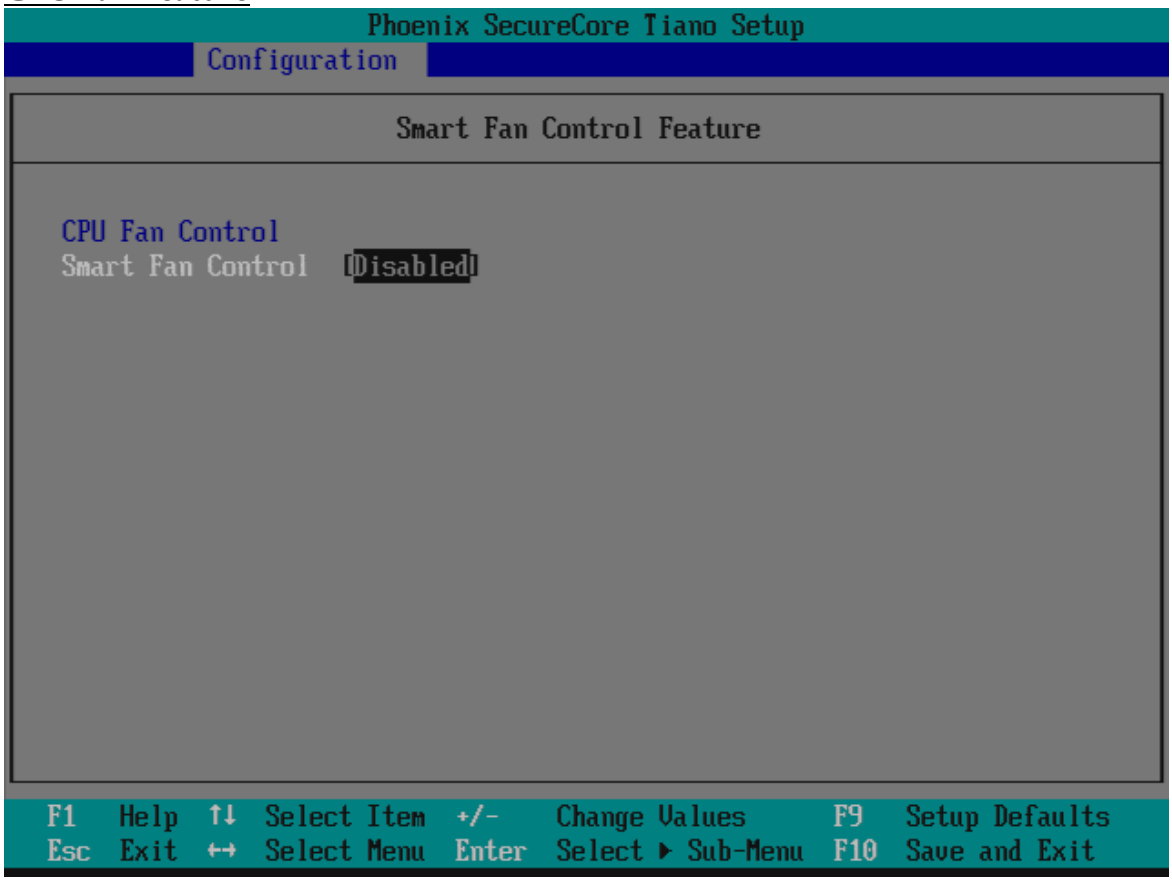
Choices: Disabled, Enable.

## Hardware Monitor

Provide on board sensor reading information. (Show only)

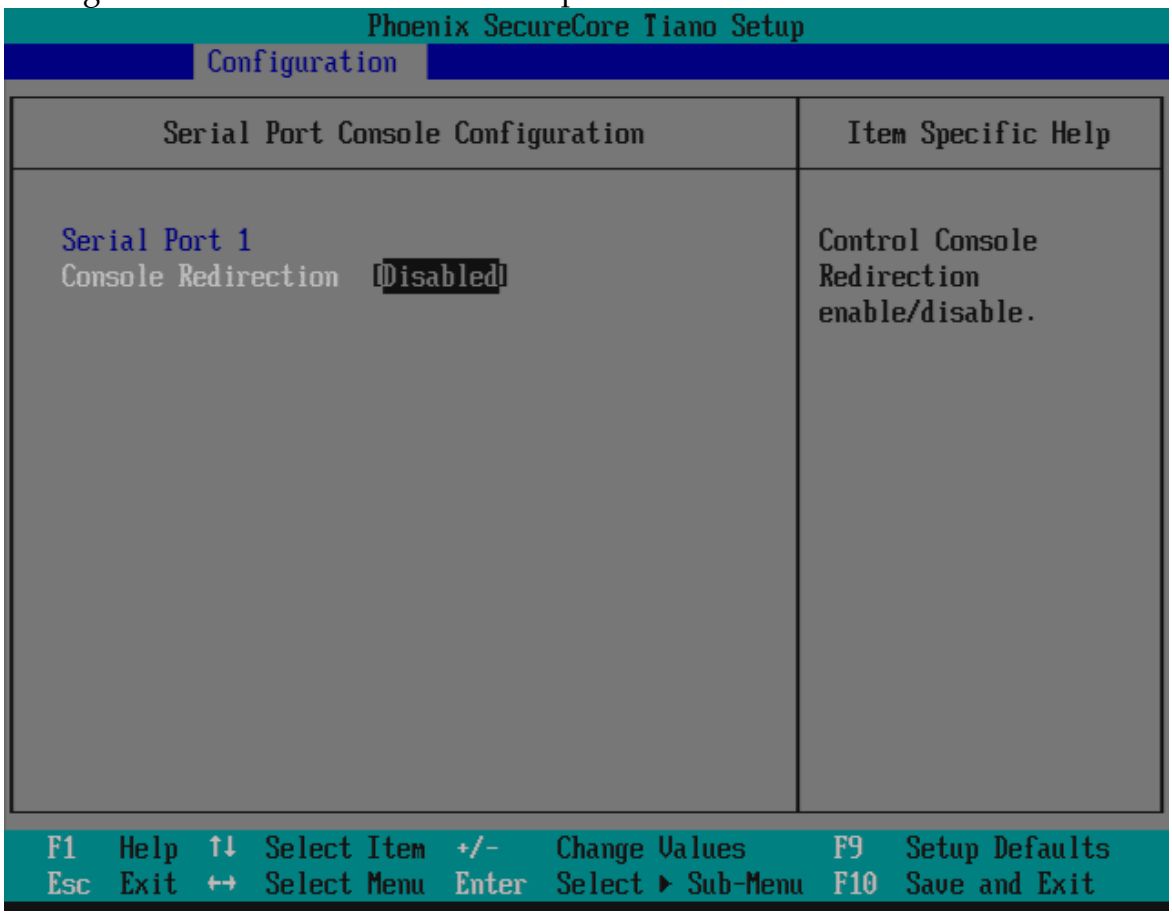

Phoenix SecureCore Tiano Setup
Configuration
Hardware Monitor
CPU Fan Feature
CPU Temperature [ 50 °C ]
System Temperature [ 30 °C ]
CPU Fan [ 5973 RPM]
System Fan [ N/A ]
VCORE [ 0.97 V ]
1.5V [ 1.48 V ]
VCC3 [ 3.39 V ]
VCC [ 5.13 V ]
+12V [ 12.22 V ]
-12V [-11.74 V ]
5VSB [ 5.02 V ]
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

## CPU Fan Feature


Phoenix SecureCore Tiano Setup
Configuration
Smart Fan Control Feature
CPU Fan Control
Smart Fan Control [Disabled]
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Smart Fan Control**
Choices: Enabled, Disabled.

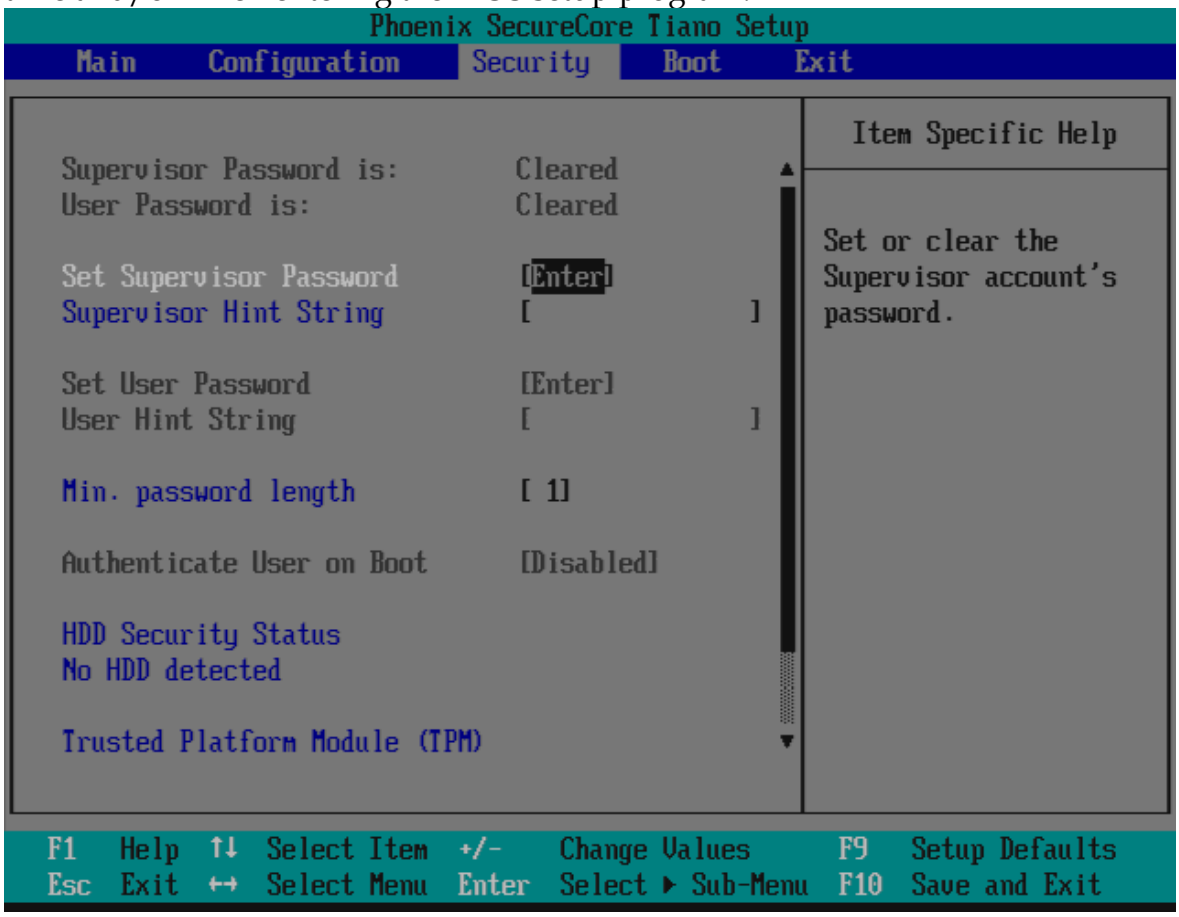
**Serial Port Console Configuration**
Configure console redirection on serial port.


Phoenix SecureCore Tiano Setup
Configuration
Serial Port Console Configuration
Item Specific Help
Serial Port 1
Console Redirection [Disabled]
Control Console Redirection enable/disable.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Console Redirection**
Control Console Redirection enable/disable.
Choices: Enabled, Disabled.

## 4.4 Security

This section lets you set security passwords to control access to the system at boot time and/or when entering the BIOS setup program.


Phoenix SecureCore Tiano Setup
Main
Configuration
Security
Boot
Exit
Item Specific Help
Supervisor Password is: Cleared
User Password is: Cleared
Set Supervisor Password [Enter]
Supervisor Hint String [ ]
Set User Password [Enter]
User Hint String [ ]
Min. password length [ 1]
Authenticate User on Boot [Disabled]
HDD Security Status
No HDD detected
Trusted Platform Module (TPM)
Set or clear the Supervisor account's password.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Set Supervisor Password**
Set or clear the Supervisor account's password.

**Supervisor Hint String**
Press Enter to type Supervisor Hint String.

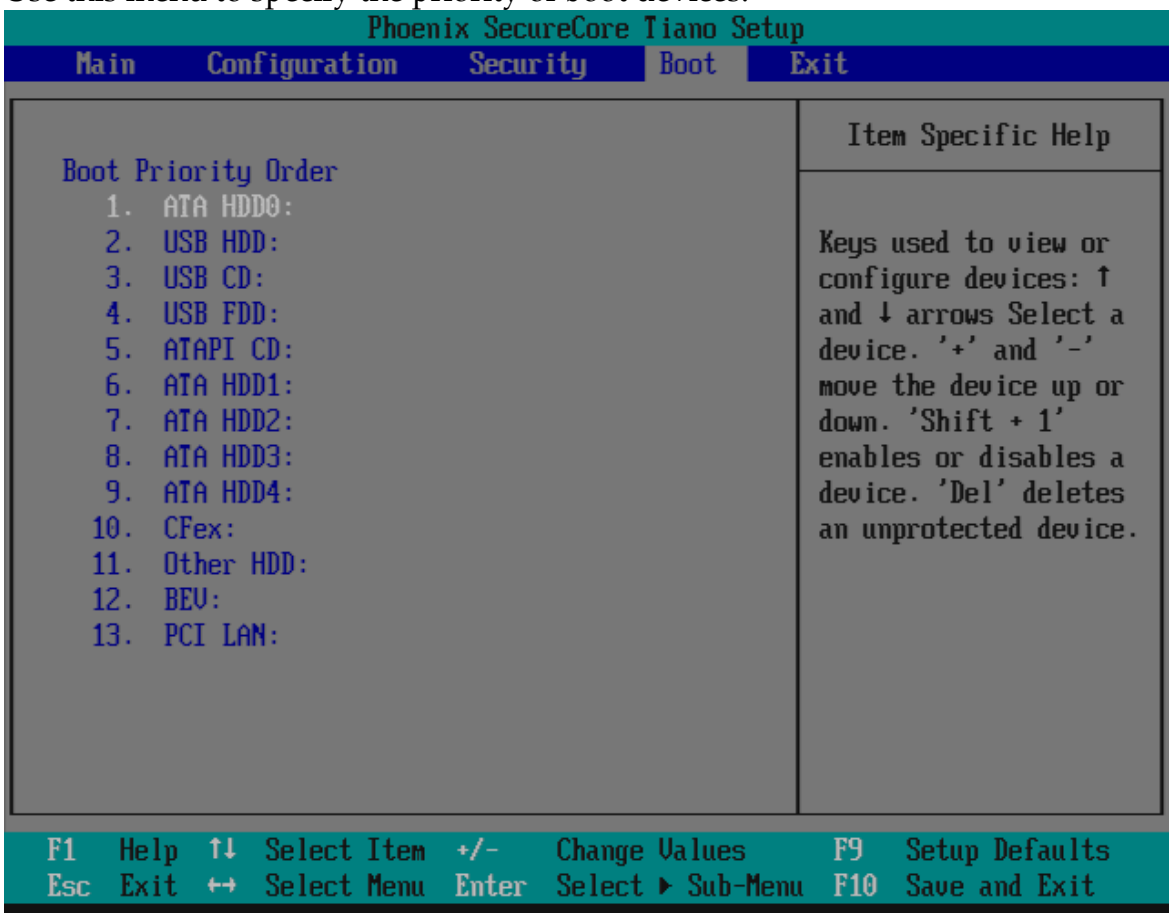
**Set User Password**
Set or clear the User account' password.

**Supervisor Hint String**
Press Enter to type User Hint String.

**Min. password length**
Set the minimum number of characters for password (1-20).

## 4.5 Boot

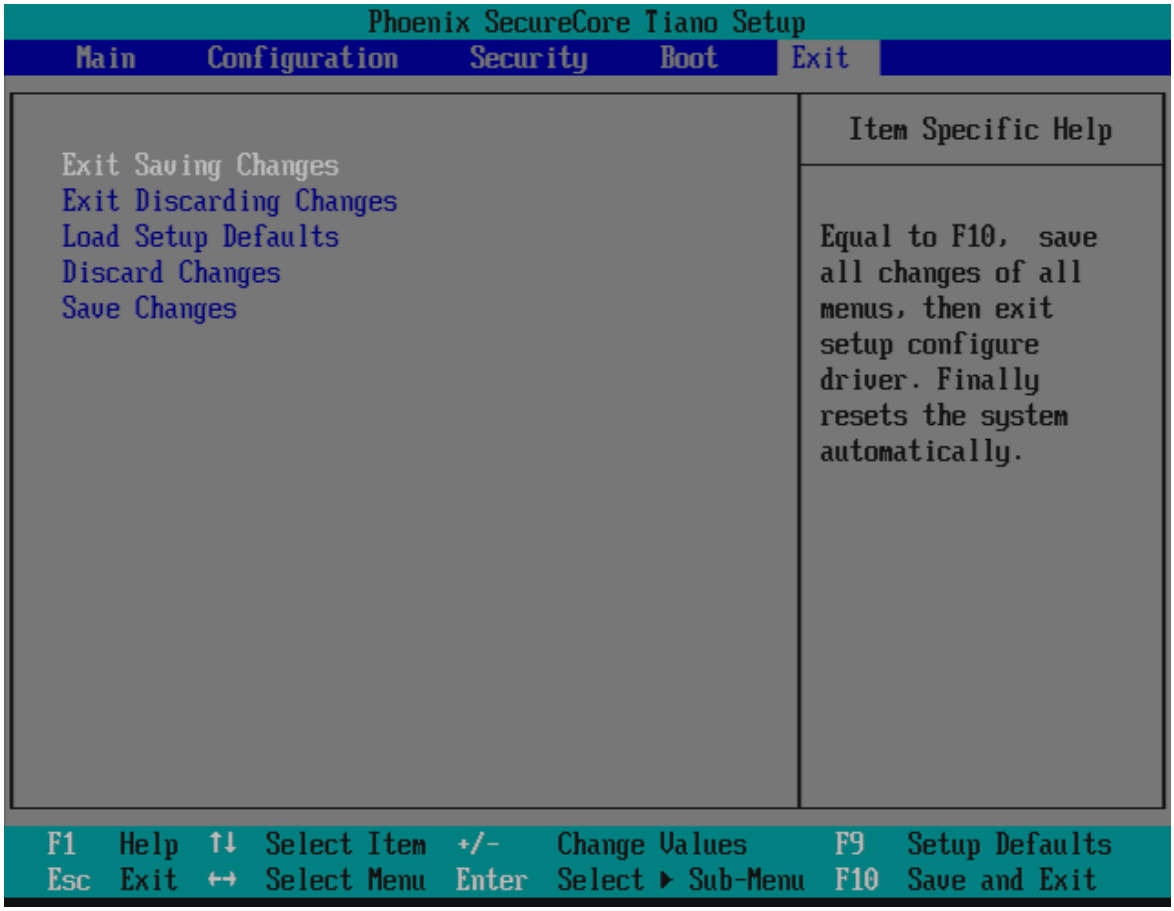
Use this menu to specify the priority of boot devices.


Phoenix SecureCore Tiano Setup
Main
Configuration
Security
Boot
Exit
Boot Priority Order
1. ATA HDD0:
2. USB HDD:
3. USB CD:
4. USB FDD:
5. ATAPI CD:
6. ATA HDD1:
7. ATA HDD2:
8. ATA HDD3:
9. ATA HDD4:
10. CFex:
11. Other HDD:
12. BEV:
13. PCI LAN:
Item Specific Help
Keys used to view or configure devices: ↑ and ↓ arrows Select a device. '+' and '-' move the device up or down. 'Shift + 1' enables or disables a device. 'Del' deletes an unprotected device.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Boot Priority Order**

Keys used to view or configure devices: ↑ and ↓ arrows Select a device. '+' and '-' 'move the device up or down. 'Shift + 1' enabled or disables a device. 'Del' deletes an unprotected device.

## 4.6 Exit


Phoenix SecureCore Tiano Setup
Main
Configuration
Security
Boot
Exit
Exit Saving Changes
Exit Discarding Changes
Load Setup Defaults
Discard Changes
Save Changes
Item Specific Help
Equal to F10, save all changes of all menus, then exit setup configure driver. Finally resets the system automatically.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

**Exit Saving Changes**
Equal to F10, save all changes of all menus, then exit setup configure driver. Finally resets the system automatically.

**Exit Discarding Changes**
Equal to ESC, never save changes, then exit setup configure driver.

**Load Setup Defaults**
Equal to F9. Load standard default values.

**Discard Changes**
Load the original value of this boot time. Not the default Setup value.

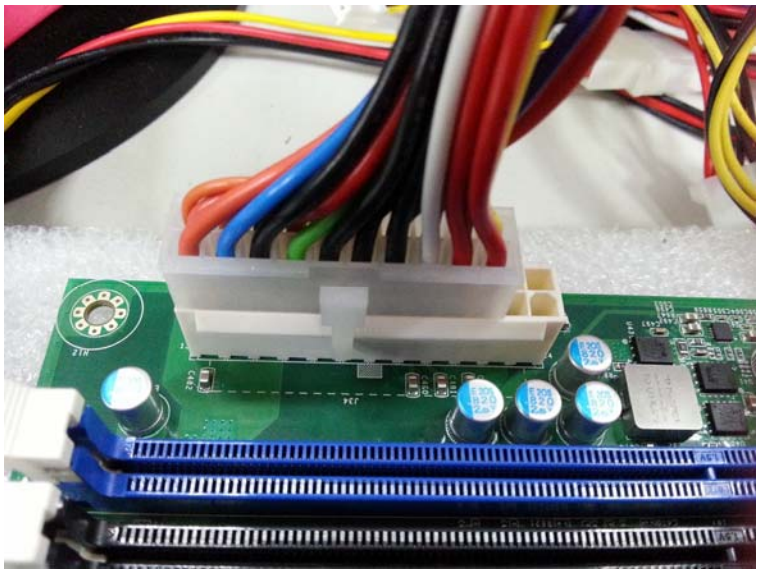
**Save Changes**
Save all changes of all menus, but do not reset sys

# Chapter 5
# Troubleshooting

This chapter provides a few useful tips to quickly get RUBY-D715 running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

## 5.1 Hardware Quick Installation

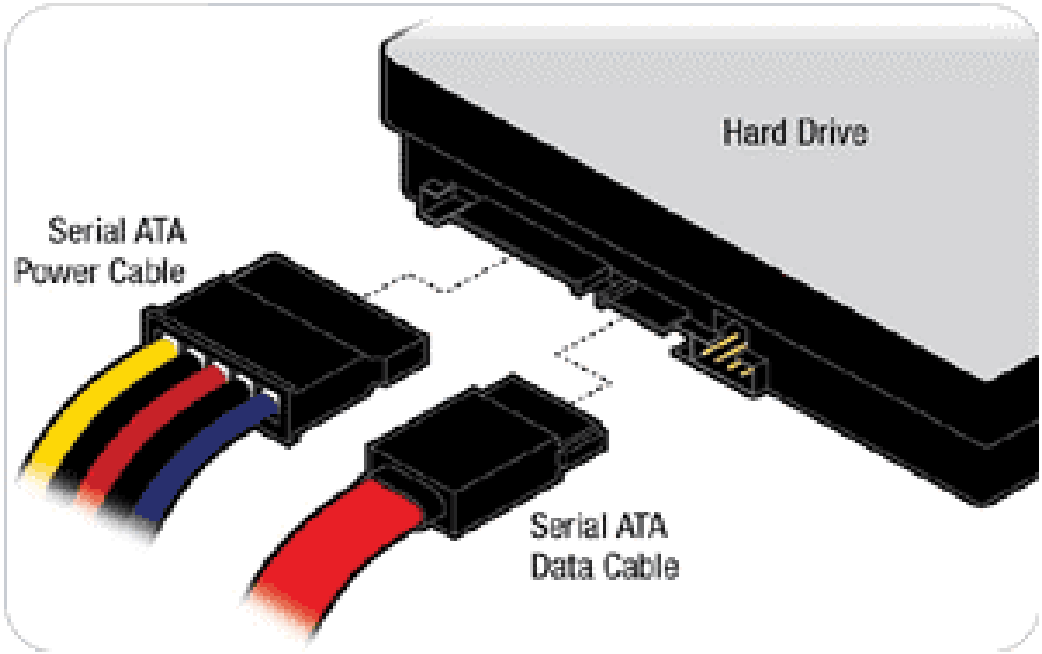
**ATX Power Setting**



RUBY-D715 supports ATX. Therefore, there is no other setting that really needs to be set up. However, there are only two connectors that must be connected—J8 (4 pins CPU +12V main power connector) & J34 (24 pins ATX Power Connector)

**ATX Power Connector**
**4-Pins CPU Main Power Connector**

**Serial ATA Hard Disk Setting for IDE/RAID/AHCI mode**
Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time; there are total five connectors, SATA1~5 port. The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation. All you need to operate IDE, RAID (0/1/5/10) and AHCI application for system, please follow up setting guide in BIOS setup utility




## 5.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. CPU, CPU Fan, 204-pin DDR3 memory, keyboard, mouse, floppy drive, SATA hard disk, DVI connector, but it only can use on DVI-D function, doesn't support DVI-I function, device power cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.
To make sure that you have a successful start with RUBY-D715, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

**Loading the default optimal setting**
When prompted with the main setup menu, please scroll down to "Load Optimal Defaults", press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

**Improper disable operation**
There are too many occasions where users disable a certain device/feature in one application through BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the COM1/ COM2 ports, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource. A few good examples are
Disable COM1 serial port to release IRQ #4
Disable COM2 serial port to release IRQ #3
Etc…
A quick review of the basic IRQ mapping is given below for your reference.

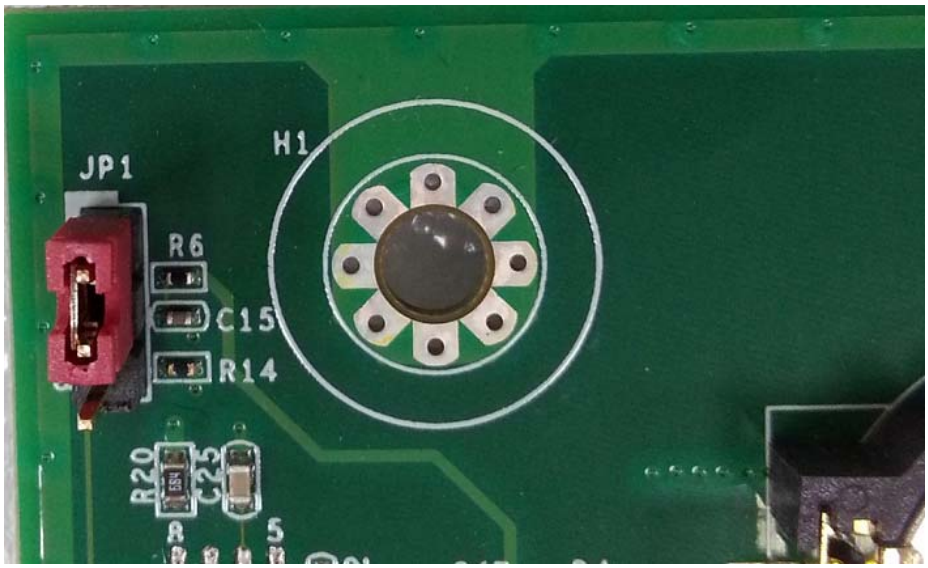
| Interrupt Request Lines IRQ | | |
|---|---|---|
| **IRQ#** | **Current Use** | **Default Use** |
| **IRQ 0** | **Unused** | **System Timer** |
| **IRQ 1** | **System ROM** | **Keyboard Event** |
| **IRQ 2** | **【Unassigned】** | **Usable IRQ** |
| **IRQ 3** | **System ROM** | **COM2** |
| **IRQ 4** | **System ROM** | **COM1** |
| **IRQ 5** | **【Unassigned】** | **Usable IRQ** |
| **IRQ 6** | **System ROM** | **Diskette Event** |
| **IRQ 7** | **Unused** | **Usable IRQ** |
| **IRQ 8** | **System ROM** | **Real-Time Clock** |
| **IRQ 9** | **【Unassigned】** | **Usable IRQ** |
| **IRQ 10** | **【Unassigned】** | **Usable IRQ** |
| **IRQ 11** | **【Unassigned】** | **Usable IRQ** |
| **IRQ 12** | **System ROM** | **IBM Mouse Event** |
| **IRQ 13** | **System ROM** | **Coprocessor Error** |
| **IRQ 14** | **System ROM** | **Hard Disk Event** |
| **IRQ 15** | **【Unassigned】** | **Usable IRQ** |

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release further IRQ numbers.

## 5.3 FAQ

**Installation Problem**

**Question:** I forget my password of system BIOS, what am I supposed to do?
**Answer:** You can simply short JP1 pin 2-3 to reset your password.




**Question:** How to update the BIOS file of the RUBY-D715?
**Answer:**
Please visit web site of the Portwell download center as below hyperlink and register an account. http://www.portwell.com.tw/support/ Input your User name and password to log in the download center. Select the "Search download" to input the keyword "RUBY-D715". Find the "BIOS" page to download the ROM file and flash utility.

Execute the zip file to root of the bootable USB Pen drive.
Insert your bootable USB Pen drive in RUBY-D715 board and power-on.
Input the "FPT /f XXXXX.ROM /BIOS" to start to update BIOS. (“XXXXX” is the file name of the ROM file.)

Switch "Off" the Power Supply when you finished the update process. To short the JP1 2-3 jumper for 5 seconds then set back to normal. (Clear CMOS)
Switch "ON" the Power Supply then press the "del" key to BIOS to load "Restore Defaults" then save them to exit.

**Note:**
Please visit our technical web site at http://www.portwell.com.tw
For additional technical information, which is not covered in this manual, you can mail to tsd@portwell.com.tw or to our sales for further assistance. Thank you.

## 5.4 System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used for your reference.

| System Memory Address Map | | |
|---|---|---|
| **Memory Area** | **Size** | **Description** |
| 0000-003F | 1K | Interrupt Area |
| 0040-004F | 0.3K | BIOS Data Area |
| 0050-006F | 0.5K | System Data |
| 0070-0548 | 19K | DOS |
| 0549-0FC2 | 41K | Program Area |
| 0FC3-9B7F | 558K | 【Available】 |
| 9B80-9D7F | 8K | Unused |
| **First Meg** | **-- Conventional memory end at 630K --** | |
| 9D80-9DFF | 2K | Extended BIOS Area |
| 9E00-9FFF | 8K | Unused |
| A000-AFFF | 64K | VGA Graphics |
| B000-BFFF | 32K | Unused |
| C000-CE5F | 32K | VGA Text |
| CE60-EFFF | 57K | Video ROM |
| | 134K | Unused |